

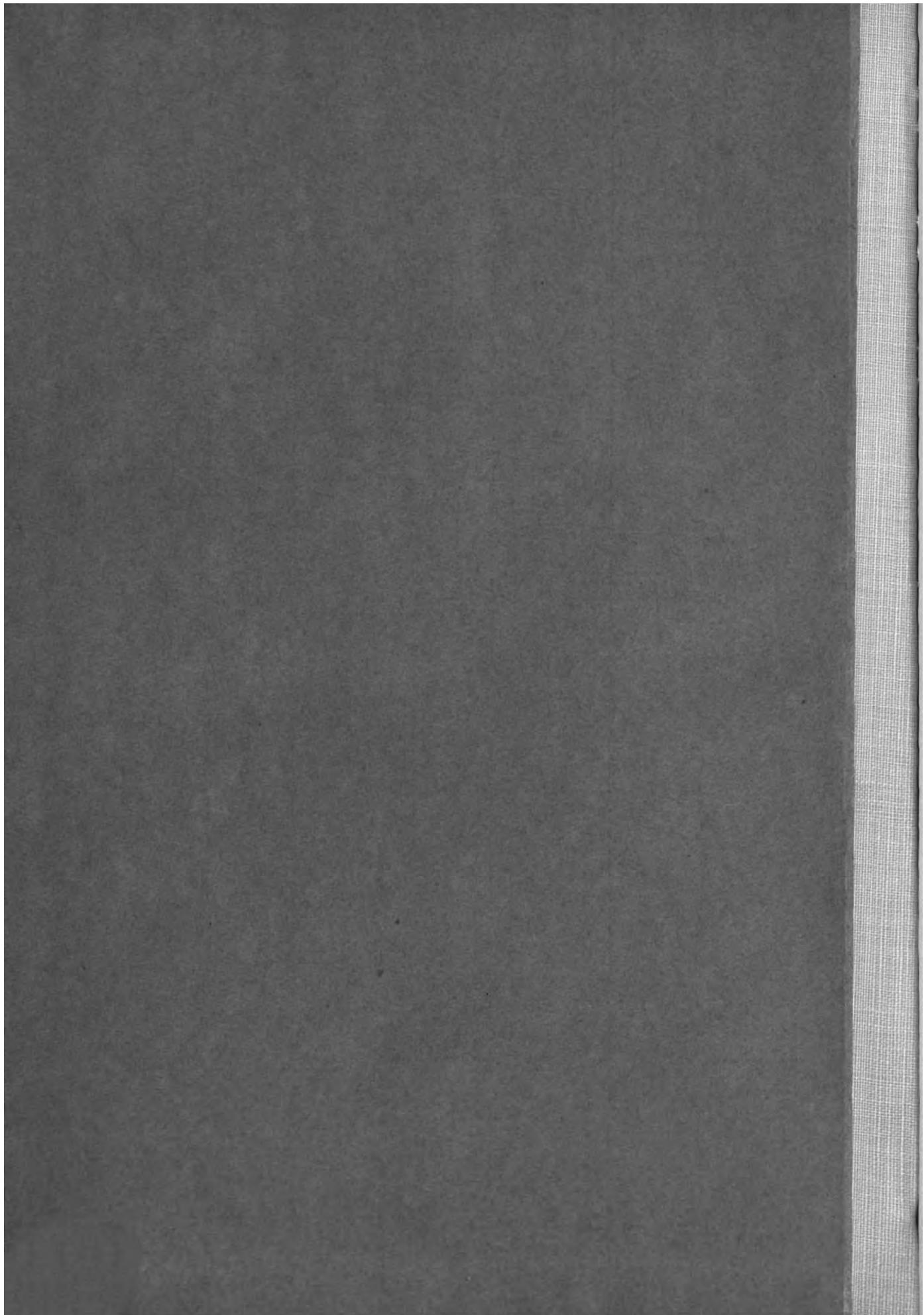
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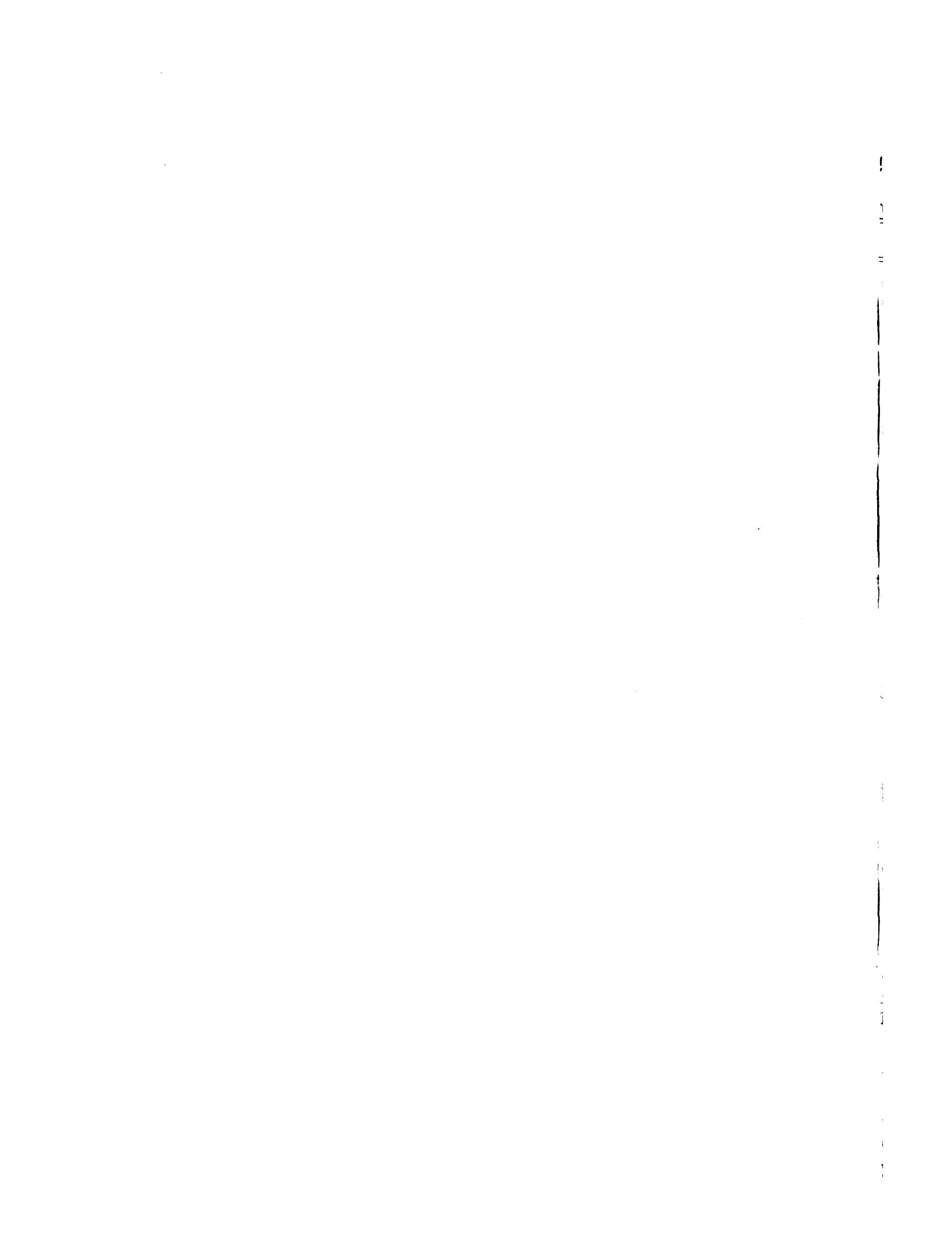
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## CONTENTS.

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### ORIGINAL ARTICLES.

Orthopaedic Methods in Military Surgery. By D. McCRAE AITKEN, M.B., Ch.B. Edin., F.R.C.S.—(Illustrated) 10

Report on Six Cases of *Amara Histolytica* Carriers Treated with Emetine Bismuthous Iodide. By Captain O. G. INSBIE, C.A.M.C., and Lieutenant W. ROCHE, R.A.M.C. (Report to the Medical Research Committee.) 17

Surface-Tension and the Wassermann Reaction. By VINCENT B. NESFIELD, F.R.C.S. Eng., &c., Major, Indian Medical Service 18

### CLINICAL NOTES:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

Notes on a Case of Traumatic Hernia of the Diaphragm Proving Fatal Seven Months after the Wound. By C. P. SYMONDS, M.R.C.P. Lond., Temporary Captain, Royal Army Medical Corps.—(Illustrated) 18

A Note on the Blood Changes in Gas Poisoning. By JAMES MILLER, M.D. Edin., F.R.C.P. Edin., Captain, Royal Army Medical Corps (T.); and HARRY RAINY, M.A., M.D. Edin., Captain Royal Army Medical Corps (T.) 19

### REVIEWS AND NOTICES OF BOOKS.

Medical Diseases of the War. By Arthur F. Hurst, M.A., M.D. Oxon., F.R.C.P. Lond., Temporary Major, R.A.M.C. 20  
The Treatment of Infantile Paralysis. By Robert W. Lovett, M.D. 21  
Medical and Veterinary Entomology. By William B. Herms 21  
Paton's List of Schools and Tutors, 1917 21  
The Passing on of Life: A Talk about Ourselves. By the Viscountess Falmouth 21  
The Greek Tradition: Essays in the Reconstruction of Ancient Thought. By J. A. K. Thomson, M.A. 21  
Miscellaneous Volumes 21

### REPORTS AND ANALYTICAL RECORDS FROM THE LANCET LABORATORY.

Eucalyptol (Cineol) 22  
"Small Tea" 22  
"Solid" Naso-pharyngeal (Buccaine) Compound 22  
"Dial-Ciba" 22

### LEADING ARTICLES.

AN IDEAL FOR THE NEW YEAR. 23  
THE LIQUOR TRAFFIC AND THE FOOD QUESTION. 23  
WELFARE WORK IN FACTORIES. 25

### ANNOTATIONS.

The Government Laboratory and the War 26  
Staphylococcal Meningitis 26  
The Metropolitan Water-supply 26  
Anesthesia in America 27  
Experimental Attempts to Transmit Pellagra 27  
Uveoparotid Fever 28  
The Tercentenary of Bartholin. 28  
THE LANCET, VOL. II., 1916: Index Notice 28

### SPECIAL ARTICLES.

Dentifrices 29  
The Control of Venereal Diseases: Scheme for the City of London.—Early Experience of Statistical Notification in Western Australia.—Routine Treatment of Venereal Diseases.—Treatment of Pregnant Women. 30  
Canada: Canadian Research Board.—Pension and Discharge Boards.—The Tuberculous Soldier in Canada.—The Clayton Convalescent Home, Halifax, N.S.—Infantile Paralysis in Ontario.—The Problem of the Feeble-minded in Toronto. 30  
Paris: Infant Welfare in Paris during the Second Year of War.—The Excellent Sanitary State of Paris.—Treatment of Gunshot Wounds with Ointments.—Antisypilistic Measures in Morocco.—The Action of Picric Acid on Blue Fus. 31  
The Services 33

### VITAL STATISTICS:

Health of English Towns 32  
Health of Scotch Towns 32  
Health of Irish Towns 33

### CORRESPONDENCE.

The Nomenclature of "Internal Secretion" (Dr. W. Blair Bell) 33  
The Parliamentary Representative of Dublin University (Prof. A. Francis Dixon, Prof. James Craig) 33  
"Shell Shock" (Dr. Thomas Lumadene) 34  
Lord Roberts's Field Glasses: A Retrospect of Two Years' Work (Lady Roberts) 34  
The Results of Feeding Mice with Mouse Cancer (Prof. A. S. Leyton, Dr. H. G. Leyton) 34  
Suprarenal Hemorrhage in Cerebro spinal Fever (Lieut. S. G. Scott, R.A.M.C.) 34  
Milk in the Diet of Infants (Dr. Douglas Firth) 41  
Pilewort (Mr. Fredk. W. Alexander) 41  
The Question of Prohibition (Mr. H. N. Robson) 42  
Irish Nurses and the College of Nursing, Limited 42

### THE WAR.

The Casualty List 37  
The Honours List 37  
Mentioned in Despatches 38  
The Somme Campaign 38  
Deaths among the Sons of Medical Men 39  
Canadian Army Medical Service 39

### OBITUARY OF THE WAR:

Albert Greenwald, M.C., Captain, South African Medical Corps 38  
Charles Humphry Gow, B.A., Camb., M.R.C.S. Eng., Temporary Surgeon, Royal Naval Division 38

### OBITUARY.

James Little, M.D. & Hon. LL.D. Edin., Hon. M.D. Dub., &c. 35  
William Cayley, M.D. Lond., F.R.C.P. Lond. 35  
Richard Birrell, F.R.C.S. Eng. 36  
Alexander Campbell McTavish, Hon. Brigade-Surgeon A.M.D. (ret.), L.R.C.S. Edin. 37  
William Jenner Best, M.R.C.S., L.S.A. 37  
Philip Grierson Borrowman, M.D. Edin. 20

### MEDICAL NEWS.

Centenarians 33  
University of London: Pass-list 39  
University of Cambridge: Pass-list 39  
Public Health in Belfast 40  
Donations and Bequests 40  
University of Malta: Conferment of Honorary Degrees 40  
The Certification of Senile Persons as Insane: A Scotch Conference 40

Appointments—Vacancies 40  
Births, Marriages, and Deaths 41  
Meteorological Readings 41  
Notes, Short Comments, and Answers to Correspondents 42  
Medical Diary 42  
Editorial Notices 43  
Manager's Notices 43  
Acknowledgment of Communications received 43

FOR INDEX TO ADVERTISEMENTS SEE PAGES 2 & 3.

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## INDEX

## MEDICAL AND OTHER BOOKS AND PUBLICATIONS

APPLETON & CO.:-	PAGE	CHURCHILL-(Continued).	PAGE	KIMPTON-(Continued).	PAGE	LIVINGSTONE (Edn.):-	PAGE
Behan—Pain .....	10	Box—Post-Mortem Manual. Handbook of Morbid Anatomy and Post-Mortem Technique .....	9	Cumberbatch—Morton's Essentials of Medical Electricity .....	12	Beattie, Sir G. T.—Modern Wound Treatment and Conduct of an Operation .....	14
Eycleshymer—Cross-Section Anatomy .....	10	Cameron—Diet and Disease in Infancy .....	9	Dalton—Practical Manual of Veterinary Diseases .....	12	Buchanan—Forensic Medicine & Toxicology .....	14
Foote—Minor Surgery .....	10	Goodhart & Still's Diseases of Children .....	9	Morton—Text-Book of Radiology .....	15	Burritt—Diseases of Children .....	14
Hall—Borderline Diseases .....	10	Holt—Uric Acid in the Clinic. Uric Acid as a Factor in the Causation of Disease .....	9	Roth's Notes on Military Orthopedics .....	12	Gris—Poisonous Substances .....	14
Hiss and Zinsser—Text-Book of Bacteriology .....	11	Holt—Uric Acid: an Epitome on the Subject .....	9	Watson—Gonorrhoea and its Complications in the Male and Female .....	12	Fordyce—Hygiene of Infancy and Childhood .....	14
Holt—Diseases of Infancy and Childhood .....	11	Haro—Alcohol: Its Clinical Aspects and Treatment.. Cover	9	Gibbs—The Extraction of Teeth ..	14	Gibbs—The Extraction of Teeth ..	14
Kelly and Burnam—Diseases of the Kidneys, Ureters, and Bladder .....	10	Hewlett—Bacteriology. Pathology, General and Special .....	9	Glaister—Medical Jurisprudence and Toxicology .....	14	Glaister—Public Health .....	14
Oliver St. John Gogarty—Principles and Practice of Medicine .....	11	Hewlett—Surgery and Vaccine Therapy .....	9	Glaister & Logan—Gas Poisoning in Mining and other Industries ..	14	Glaister & Logan—Gas Poisoning in Mining and other Industries ..	14
Reagan—Preventive Medicine and Hygiene .....	11	Lee—Microscopist's Vade Mecum. Morris's Human Anatomy .....	9	Hewitt—Examination of the Urine .....	14	Hewitt—Examination of the Urine .....	14
Thompson—Occupational Diseases .....	10	Parsons—Diseases of the Eye .....	9	Hope—Text-Book of Public Health .....	14	Hughes—Nerves of the Human Body .....	14
<b>ARNOLD:-</b>		Rohlin—Treatment of Tuberculosis .....	9	Jack—Wheeler's Handbook of Medicine .....	14	Jack—Wheeler's Handbook of Medicine .....	14
Andrews—Midwifery for Nurses .....	4	Saint—Taylor's Medical Jurisprudence .....	9	Macdonald—Student's Pocket Prescriber, &c .....	14	Macdonald—Student's Pocket Prescriber, &c .....	14
Beveridge & Wanhill—Sanitary Officer's Handbook of Practical Hygiene .....	4	Somire's Companion to the British Pharmacopœia .....	15	M'Kendrick—Back Injuries .....	14	M'Kendrick—Back Injuries .....	14
Diseases of Children .....	4	Somire's Companion to the British Pharmacopœia .....	15	Gould—Practitioner's Medical Dictionary .....	7	Skirving—Applied Anatomy .....	14
Howard—Surgical Nursing and the Principles of Surgery for Nurses .....	4	Starling—Principles of Physiology .....	9	Gould—A Pocket Medical Dictionary .....	7	Whitaker—Anatomy of the Brain and Spinal Cord .....	14
Hurst—Medical Diseases of the War .....	4	Stimson—Fractures and Dislocations .....	9	Whitaker—Surgical Anatomy .....	14	Whitaker—Surgical Anatomy .....	14
Hutchinson—Food and the Principles of Dietetics .....	4	Turner & Stewart—Text-Book of Nervous Diseases .....	9	<b>LONGMANS, GREEN &amp; CO.:-</b>			
Melville—Military Hygiene and Sanitation .....	4	Stewart—Essentials of Surface Anatomy .....	9	Bennett, Sir Wm.—Massage and Movements in Recent Fractures, &c .....	12		
Sibley—Treatment of Diseases of the Skin .....	1	<b>CONSTABLE &amp; CO.:-</b>		Kidd—Common Diseases of the Male Urethra .....	12		
Stewart—Diagnosis of Nervous Diseases .....	1	Battle—The Acute Abdomen .....	14	Kidd—Urinary Surgery .....	12		
Woodward—Medical Nursing .....	4	Battle—Surgery of Diseases of the Appendix, Vermiformis and their Complications .....	14	<b>MACMILLAN &amp; CO.:-</b>			
<b>FAILLIE, THEDALL &amp; CO.:-</b>		Keen—Animal Experimentation and Medical Progress .....	14	Allbutt, Sir Clifford—Diseases of the Arteries, including Angina Pectoris .....	12		
Hayes—Intensive Treatment of Syphilis and Locomotor Ataxia by Aachen Methods .....	1	Kellogg & Doane—Economic Zoölogy and Entomology .....	14	Mandeville—Organic to Human: Psychological and Social .....	12		
Macewen's Surgical Anatomy .....	1	Moran, &c.—The Mechanism of Mendelian Heredity .....	14	New System of Gynecology .....	12		
<b>BAILE, SONS &amp; DANIELSSON:-</b>		Shennan—Post-Mortem and Morbid Anatomy .....	14	New System of Medicine .....	12		
Cochrane & Sprawson—A Guide to the Use of Thioridin .....	1	Spiegel—Chemical Constitution and Physiological Action .....	14	<b>MEDICAL PUBLISHING CO.:-</b>			
Worth—Squint: its Causes, Pathology and Treatment .....	1	Wright, Sir A. E.—Handbook of the Technique of the Test and Capillary Glass Tube .....	14	Lane, Sir A.—Operative Treatment of Fractures .....	12		
<b>CASSELL &amp; CO.:-</b>		Wright, Sir A. E.—Studies on Immunisation and their Application to the Diagnosis and Treatment of Bacterial Infections .....	14	<b>NISBET &amp; CO.:-</b>			
Bosanquet and Eyre—Serums, Vaccines, and Toxins in Treatment and Diagnosis .....	8	<b>FROWDE AND HODDER &amp; STOUGHTON:-</b>		Bennett, Sir Wm.—Injuries and Diseases of Knee-Joint .....	12		
Herman—Difficult Labour .....	8	McCann—Cancer of the Womb: its Symptoms, Diagnosis, Prognosis, and Treatment .....	12	<b>SAUNDERS COMPANY:-</b>			
Herman and Maxwell—Student's Handbook of Gynaecology .....	8	Warren—Surgical Diseases of the Gall Bladder, Bile Ducts, and Liver .....	12	Anders—Practise of Medicine .....	5		
Manson, Sir Patrick—Tropical Diseases .....	8	Warlock—Manual of Operative Surgery .....	14	Ortle & Lower—Anæsthesia .....	5		
Morris, Sir Malcolm, and Iore—Diseases of the Skin .....	8	<b>GRIFFIN &amp; CO.:-</b>		De Costa—Modern Surgery .....	5		
Sutherland—Pulmonary Tuberculosis in General Practice .....	8	Reid—Practical Sanitation .....	12	De Schwanzlitz—Diseases of the Eye .....	5		
System of Surgery .....	8	Davies & Melville—Hygiene .....	12	Keyley—Practise of Pediatrics .....	5		
Thomson, H. C.—Diseases of the Nervous System .....	8	<b>KIMPTON:-</b>		Pilcher—Practical Cystoscopy .....	5		
Thomson, Sir R. G.—Diseases of the Nose and Throat .....	8	Ballet—Neurasthenia .....	15	Saunders' Books for the Practitioner .....	1		
Treves, Sir F., and Hutchinson—Student's Handbook of Surgical Operations .....	8	Colbeck and Chaplin—Science and Art of Prescribing .....	15	Scudier—Treatment of Fractures .....	5		
Yeo, Crawford, and Buzzard—A Manual of Medical Treatment .....	8	Cryer—The Internal Anatomy of the Face .....	15	<b>WRIGHT &amp; SONS (Bristol):—</b>			
<b>CHURCHILL, J. &amp; A.:-</b>		<b>LIPPINCOTT CO.:-</b>		An Index of Prognosis and End-Results of Treatment .....	12		
Berkely and Bonney—Difficulties and Emergencies of Obstetric Practice .....	9	Bill—Pharmacology and Therapeutics .....	15	<b>MEDICAL LIBRARIES, &amp;c.:-</b>			
Bowby, Sir A. A., and Andrews—Surgical Pathology and Morbid Anatomy .....	9	Flagg—The Art of Anæsthesia .....	15	Baker—Books .....	17		
<b>CHURCHILL, J. &amp; A.:-</b>		Harzelz—Diseases of the Skin: their Pathology and Treatment .....	15	Behnke—Stammering, Lispings, & Cleft Palate Speech .....	14		
Berkely and Bonney—Difficulties and Emergencies of Obstetric Practice .....	9	Krehl—The Basis of Symptom-Nonne—Syphilis and the Nervous System. For Practitioners, Neurologists, and Psychologists .....	13	Ketley—Stammering .....	14		
Bowby, Sir A. A., and Andrews—Surgical Pathology and Morbid Anatomy .....	9	Roberts and Kelly—Treatise on Fractures .....	15	Matthews—Wood: Application of Trusses to Herniae .....	17		
<b>ASYLUMS, HOMES, &amp;c.:-</b>		Skilern—The Catarhal and Suppuratory Diseases of the Accessory Sinuses of the Nose .....	13	Scholl Mfg. Co.—Scientific Correction for Aliments of the Feet .....	17		
Ashwood House, Kingswinford .....	72	Von Flüth—Physiology, &c. Chemistry of Metabolism .....	13	The Prescriber .....	50		
Barnwood House Hospital .....	72	Wood—Pharmacology and Therapeutics .....	15				
Bishopstone House, Redford .....	72	<b>ASYLUMS (Continued).—</b>					
Bronthorpe House, Lancaster .....	72	Moat House, Tamworth .....	72	<b>MESSAGE:-</b>			
Camborne House, Peckham-road .....	72	Newmains Retreat, Lanarkshire .....	74	Associated Male Nurses and Missours .....	71		
Chedde Row .....	72	Newgaughton Hall, Polton, Midlothian .....	73	Sharman .....	71		
Clerence Lodge, Clapton Park .....	72	Northwood House, Winterbourne .....	74	<b>MEDICAL ACCOUNTANTS, &amp;c.:-</b>			
Colthurst House School, Alderley Edge .....	72	Otto House, West Kensingston .....	71	Turner .....	79		
Coppice, The, Nottingham .....	72	Pendyfryn Hall Sanatorium, Norrach-in-Wales .....	74	<b>MEDICAL AGENTS:-</b>			
Dairymply House, R. Kmanswoorth .....	72	Plympton House, Plympton .....	72	Fieldhall, Limited .....	79		
David Lewis Colony, Alderley Edge .....	72	Plymouth Corporation Mental Hospital .....	75	Manchester Clerical, &c. Association .....	73		
Duff House, Banff .....	72	Royal Earlswood Institution for Mental Defectives .....	73	Medical Agency .....	79		
General Manager, Craven street .....	72	St. Andrew's Hospital, Dollis Hill .....	72	Needes, J. C. .....	79		
Grove House, Church Stretton .....	72	St. George's Hospital, Northampton .....	72	Peacock & Hadley .....	79		
Grove, The, Catton, Norwich .....	72	St. George's Retreat, Burgess Hill .....	76	Turner .....	79		
Baslemere Nursing Home .....	72	St. Vincent's Surgical and Industrial Home for Crippled Boys .....	73				
Haydock Lodge, Newton-le-Willows .....	72	Springfield House Private Asylum, Bedford .....	71	<b>MEDICAL SCHOOL:-</b>			
Heighams Hall, Norwich .....	72	St. Andrew's Hospital, Dollis Hill .....	72	(London.)			
Homes for Inebriate Women .....	72	Strutton House, Church Stretton .....	72	Hospital for Sick Children .....	67		
London Fever Hospital .....	72	The Grange, near Rotherham .....	72	London School of Clinical Medicine .....	69		
Malling Place, Kent .....	72	Vale of Clwyd Sanatorium .....	74	University of London, King's College .....	68		
Melbourne House, Leicester .....	72			West London Post-Graduate College .....	69		
Mendip Hills Sanatorium .....	72			(Provincial, &c.)			

## OFFICIAL AND GENERAL ANNOUNCEMENTS

ASSISTANTSHIP, MEDICAL .....	78	ASYLUMS (Continued).—		<b>MESSAGE:-</b>	
<b>ASYLUMS, HOMES, &amp;c.:-</b>		Warneford Asylum, Oxford .....	76	Associated Male Nurses and Missours .....	71
Ashwood House, Kingswinford .....	72	Wye House, Buxton .....	72	Sharman .....	71
Barnwood House Hospital .....	72	<b>COMPANIES:-</b>		<b>MEDICAL ACCOUNTANTS, &amp;c.:-</b>	
Bishopstone House, Redford .....	72	No. 228, L.O., Strand .....	78	Turner .....	79
Bronthorpe House, Lancaster .....	72	<b>FINANCIAL, &amp;c.:-</b>		<b>MEDICAL AGENTS:-</b>	
Camborne House, Peckham-road .....	72	Equitable Reversionary Interest Society .....	89	Fieldhall, Limited .....	79
Chedde Row .....	72	<b>HEALTH RESORTS, BATHES, &amp;c.:-</b>		Manchester Clerical, &c. Association .....	73
Clerence Lodge, Clapton Park .....	72	Alexandra Therapeutic Institute .....	75	Medical Agency .....	79
Colthurst House School, Alderley Edge .....	72	Caterham Sanatorium .....	75	Needes, J. C. .....	79
Coppice, The, Nottingham .....	72	Droitwich Brine Baths .....	72	Peacock & Hadley .....	79
Dairymply House, R. Kmanswoorth .....	72	Smedley's, Matlock .....	71	Turner .....	79
David Lewis Colony, Alderley Edge .....	72	<b>HOSPITAL INFIRMARY, SANATORIUM, &amp;c., VACANCIES:-</b>	78-79		
Duff House, Banff .....	72		78-79		
General Manager, Craven street .....	72				
Grove House, Church Stretton .....	72				
Grove, The, Catton, Norwich .....	72				
Baslemere Nursing Home .....	72				
Haydock Lodge, Newton-le-Willows .....	72				
Heighams Hall, Norwich .....	72				
Homes for Inebriate Women .....	72				
London Fever Hospital .....	72				
Malling Place, Kent .....	72				
Melbourne House, Leicester .....	72				
Mendip Hills Sanatorium .....	72				

# THE LANCET.

No. 4872.

LONDON, SATURDAY, JANUARY 13, 1917.

Vol. CXCII.

## CONTENTS.

*The whole of the literary matter in THE LANCET is copyright.*

**THE HORACE DOBELL LECTURE** on the Mechanism of the Serum Reactions. Delivered before the Royal College of Physicians of London on Nov. 7th, 1916, by H. R. DEAN, M.D., Oxon., F.R.C.P.Lond., Professor of Pathology, University of Manchester..... 45

**PRESIDENTIAL ADDRESS** on the State Octopus and the Medical Profession. Delivered at the Harveian Society of London on Jan. 11th, 1917, by EDMUND CAUTLEY, M.D., Camb., F.R.C.P.Lond., Senior Physician at the Metropolitan Hospital and the Belgrave Hospital for Children..... 50

### ORIGINAL ARTICLES.

Cases of Cerebro-spinal Fever in the Royal Navy—August 1st, 1916, to July 31st, 1916. By H. D. BOLLISTON, C.B., M.D. Cantab., F.R.C.P. Lond., Temporary Surgeon-General, R.N.; Consultant Physician to the Royal Navy, Royal Naval Hospital, Haslar; Senior Physician, St. George's Hospital..... 54

Four Cases of Hemiplegia caused by Embolism following Gunshot Wounds of the Carotid Arteries. By L. COLLEGE, M.B. Cantab., F.R.C.S. Eng., Captain, Royal Army Medical Corps (T.F.); and JOHN SAW DUNN, M.D., Ch.B. Glasg., Lieutenant, Royal Army Medical Corps (T.C.).—(Illustrated)....

On the Presence of an Accessory Food Factor in the Nasal Secretion and its Action on the Growth of the Meningococcus and Other Pathogenic Bacteria. (Preliminary Paper.) By CRESSWELL SHEARER, M.D., F.R.S., Military Hospital, Devonport. (Report to the Medical Research Committee.)—(Illustrated)..... 59

A Note on the Cause and Prevention of Trench Foot. By C. NEPEAU, LOVERIDGE, M.D., Vice-Captain, M.R.C.P. Lond., Lieutenant, Royal Army Medical Corps..... 62

### CLINICAL NOTES:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

- ▲ Case of Sarcoma of the Mediastinum Invading the Lung. By A. G. M. GRANT, M.D. Edin., D.P.H., First Assistant Medical Officer, Westmorland Sanatorium, Grange-over-Sands..... 63
- A Case of Large Omental Cyst in a Child. By FREDERICK C. PYBUS, M.S. Durh., F.R.C.S. Eng., Surgeon to the Hospital for Sick Children; Assistant Surgeon to the Royal Victoria Infirmary, Newcastle-on-Tyne.—(Illustrated)..... 63

### MEDICAL SOCIETIES.

- ROYAL SOCIETY OF MEDICINE: SECTION OF HISTORY OF MEDICINE:—Casanova's Mémoires..... 64

### REVIEWS AND NOTICES OF BOOKS.

- Diseases of the Umbilicus. By Thomas S. Cullen, M.B..... 64
- Tratado de Pediatría. Por el Dr. Martínez Vargas..... 65
- Infection and Immunity. A Text book of Immunology and Serology for Students and Practitioners. By Charles E. Simon, B.A., M.D. Third edition..... 65
- The Charaka Club. Vol. IV....
- The Care of the School Child. Edited by James Kerr, M.A., M.D. Cantab..... 65
- Human Temperaments. By Charles Mercier, M.D. Lond., F.R.C.P. Lond..... 65
- Wheels: An Anthology of Verse Poland's Case for Independence: A Series of Essays Illustrating the Continuance of Her National Life..... 66
- Annals of Tropical Medicine and Parasitology. Vol. X, No. 1 British Journal of Ophthalmology..... 66

### LEADING ARTICLES.

- PREVENTIVE TREATMENT IN RELATION TO VENEREAL DISEASE  
MOBILISATION OF THE MEDICAL PROFESSION..... 67

### ANNOTATIONS.

- Health of the Prison Population..... 68
  - The Pig as a Food Middleman..... 69
  - The Internal Form of Hodgkin's Disease..... 69
  - The Parliamentary Representative of Dublin University..... 70
  - Osteochondromatosis of Joint Capsules..... 70
  - Sanitation and Disease in Bengal..... 71
- THE LAW OFF. VOL. II., 1916: Index Notice..... 72

### SPECIAL ARTICLES.

- Prison Commissioners' Report..... 72
- King Edward's Hospital Fund for London..... 73
- Medicine and the Law..... 73
- Public Health of Manchester..... 74
- Ireland..... 76
- The Services..... 76

### VITAL STATISTICS:

- Health of Scotch Towns..... 77
- Health of Irish Towns..... 77

### CORRESPONDENCE.

- The Liquor Traffic and the Food Question (Dr. Chalmers Watson, Dr. James Dunlop). .... 77
- Agglutination Reactions in Typhoid and Paratyphoid Fevers (Captain H. Graeme Gibson, R.A.M.C.)—(Illustrated)..... 78
- The Nomenclature of "Internal Secretion" (Professor Sir Edward A. Schäfer)..... 80
- The Differentiation of Heart Murmurs in Soldiers (Dr. Theodore Fisher)..... 80
- Staphylococcus Meningitis (Captain Sheffield Neave, R.A.M.C.)..... 81
- A New Culture Medium for the Meningococcus (Mr. J. H. Johnston)..... 81
- The Hot air Oven as an Incubator (Mr. H. L. Cooper)..... 82

### OBITUARY.

- The Senator de Giovanni..... 87
- W. A. Lauder Smith, M.A., M.B., B.C. Cantab..... 54
- Surgeon-General Sir Frederick William Borden..... 83

### THE WAR.

- The Casualty List..... 82
- Deaths among the Sons of Medical Men..... 82
- Mentioned in Despatches..... 82
- The Employment of American Doctors..... 83
- New Red Cross Hospital for Gloucester..... 83
- The First British Red Cross Unit in Italy..... 85
- The Panel Committee for the County of London and the Mobilisation of the Medical Profession..... 86
- Convalescent Home in Calcutta..... 86

### OBITUARY OF THE WAR:

- Norman Ernest Jasper Harding, M.B., Ch.B. Ed., Major, R.A.M.C. (With Portrait)..... 84
- Roger Forrest Hughes, B.A., M.B., Ch.M., Sydney Captain, A.A.M.C. (With Portrait)..... 84
- Charles Kenneth McKerrow, M.A., M.B., B.C. Camb., Captain, R.A.M.C. (With Portrait)..... 84
- Clifford Crawshaw Pickles, M.R.C.S., D.P.H. Leeds, late Captain, R.A.M.C. (I.F.)—(With Portrait)..... 84

### MEDICAL NEWS.

- Donations and Bequests..... 84
- Russian Medical Scholarships..... 77
- Centenarians..... 82
- University of Edinburgh..... 82
- Metropolitan Asylums Board: Threatened Shortage of Ambulances..... 86
- University of London: Pass-list Examining Board in England by the Royal Colleges of Physicians of London and Surgeons of England: Pass-list..... 87
- Royal College of Surgeons of England: Pass-list..... 88
- Royal Medical Benevolent Fund..... 88
- Royal Society of Arts (John-street, Adelphi)..... 88
- Royal Sanitary Institute..... 83
- Appointments—Vacancies..... 89
- Births, Marriages, and Deaths..... 89
- Books, &c., received..... 89
- Notes, Short Comments, and Answers to Correspondents..... 90
- Medical Diary..... 90
- Meteorological Readings..... 91
- Editorial Notices..... 91
- Manager's Notice..... 91
- Acknowledgment of Communications received..... 91

FOR INDEX TO ADVERTISEMENTS SEE PAGE 2.

**JOHN BALE, SONS & DANIELSSON, LTD.,**  
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83, 85, 87, 89 & 91, GREAT TITFIELD ST., OXFORD ST., LONDON, W.

## INDEX

## MEDICAL AND OTHER BOOKS AND PUBLICATIONS

PAGE		PAGE		PAGE		PAGE
BAILLIÈRE TINDALL & COX.—		CHURCHILL, J. & A.—		LONGMAN.—(Continued).		SAUNDERS CO.—(Continued).
Cobb—The Organs of Internal Secretion ..... Cover 1		Thorne, Besly—Schott Methods of Treatment of Chronic Diseases of the Heart ..... 4		Gaskell—Involuntary Nervous System ..... 5	Medical Clinics of Chicago ..... 3	
Freyer—Enlargement of the Prostate ..... Cover 1		Quain's Elements of Anatomy ..... 5		Medical Clinics of Chicago. Cover 1		
Freyer—Surgical Diseases of the Urinary Organs ..... Cover 1		Watson Williams—Rhinology: a Text-Book of the Diseases of the Nose and Accessory Sinuses ..... Cover 1		Sanders—Modern Methods in Nursing ..... 3		
Lockhart-Mummery—Diseases of the Colon and their Surgical Treatment ..... Cover 1		MULLIN.—				
Macewen's Surgical Anatomy ..... Cover 1		Enlargement of Prostate ..... Cover 1		WRIGHT & SONS (Barrett).—		
BALE, SONS & DANIELSSON.—		The Biology of Tumours ..... Cover 1		Graves—Modern Methods of Treating Fractures ..... Cover 1		
Goodwin—Field Service Notes for R.A.M.C. ..... 1		Scientific Books ..... 4				
Hawthorne—Studies in Clinical Medicine ..... Cover 1		LONGMANS, GREEN & CO.—		MEDICAL LIBRARIES, &c.—		
CASSELL & CO.—		Bainbridge & Mensies—Essentials of Physiology ..... 5		Baker—Books ..... 4		
Walker—Surgical Diseases and Injuries of the Genito-Urinary Organs ..... Cover 1		Baylis—Principles of General Physiology ..... 5		Behnke—Stammering, Lipping, & Cleft Palate Speech ..... 4		
		Besson—Practical Bacteriology, Microbiology, & Serum Therapy ..... 5		Ketley—Stammering ..... 4		
		Colyer—Dental Surgery and Pathology ..... 5		Lewis & Co.'s Medical and Scientific Circulating Library ..... 4		
				Lewis & Co.'s Medical and Scientific Circulating Library. Cover 1		
				Matthews—Wood: Application of Trusses to Hernia ..... 4		

## OFFICIAL AND GENERAL ANNOUNCEMENTS

ASSISTANCES, MEDICAL ..	41, 42	ASYLUMS.—(Continued).	
ASYLUMS, HOMES, &c.—		Peckham House ..... 37	
Ashwood House, Kingswinford ..... 35		Pendyffryn Hall Sanatorium, Nor- drach-in-Wales ..... 38	
Barnwood House Hospital ..... 38		Plympton House, Plympton ..... 38	
Blairstown House, Bedford ..... 35		Portsmouth Corporation Mental Hospital ..... 39	
Bruntwood House, Lancaster ..... 35		St. Andrew's Hospital, Dollis Hill ..... 39	
Camberwell House, Peckham- road ..... 37		St. Andrew's Hospital, North- ampton ..... 36	
Clarence Lodge, Clapham Park ..... 35		Shaftesbury House, Formby-by-the-Sea ..... 37	
Colthurst House School, Alderley Edge ..... 38		Springfield House Private Asylum, Bedford ..... 35	
Coppice, The, Nottingham ..... 38		Skelton House, Church Stretton ..... 46	
Dalrymple House, Eckmans- worth ..... 37		Theatre, near Rotherham ..... 34	
Dartmoor Sanatorium ..... 38		Vale of Clwyd Sanatorium ..... 39	
David Lewis Colony, Alderley Edge ..... 38		Warneford Asylum, Oxford ..... 37	
Duff House, Banff ..... 39		Wye House, Buxton ..... 38	
General Manager, Craven-street ..... 38			
Ghyllwoods Sanatorium ..... 37			
Grove House, Church Stretton ..... 38			
Grove, The, Catton, Norwich ..... 38			
Haslemere Nursing Home ..... 35			
Hazelock House, Newton-le- Willows ..... 37			
Heigham Hall, Norfolk ..... 36			
Homes for Inebriate Women ..... 37			
Littleton Hall, Brentwood ..... 38			
London Fever Hospital ..... 38			
Malling Place, Kent ..... 36			
Melbourne House, Leicester ..... 37			
Mendip Hills Sanatorium ..... 38			
Moat House, Tamworth ..... 38			
Newmains Retreat, Lanarkshire ..... 38			
Nordrach-on-Dee, Banchory ..... 38			
Northumberland House, Finsbury Park ..... 38			
Northwoods House, Winterbourne ..... 37			

		LIFE & FIRE ASSURANCES, &c.—	
		Medical Sickness and Accident Society ..... 21	
		Prudential ..... 34	
		MESSAGE.—	
		Associated Male Nurses and Missresses ..... 34	
		Sharma ..... 35	
		MEDICAL ACCOUNTANTS, &c.—	
		Turner ..... 42	
		MEDICAL AGENTS.—	
		Fieldhall, Limited ..... 45	
		Manchester Clerical, &c. Association ..... 45	
		Thomson, &c. ..... 45	
		Vale of Clwyd ..... 39	
		Warneford Asylum, Oxford ..... 37	
		Wye House, Buxton ..... 38	
		FINANCIAL, &c.—	
		Equitable Reversionary Interest Society ..... 31	
		HEALTH RESORTS, BATHS, &c.—	
		Caterham Sanitarium ..... 39	
		Droitwich Brine Baths ..... 39	
		Peebles Hotel Hydro ..... 39	
		Smedley's, Matlock ..... 39	
		HOMES WANTED.—	
		No. 23, L.O. Strand ..... 39	
		Turner, Adam-street ..... 39	
		HOSPITAL, INFIRMARY, SANATORIUM, &c., VACANCIES .. 39-41	

		LIVE & FIRE ASSURANCES, &c.—	
		Medical Sickness and Accident Society ..... 21	
		Prudential ..... 34	
		MESSAGE.—	
		Associated Male Nurses and Missresses ..... 34	
		Sharma ..... 35	
		MEDICAL ACCOUNTANTS, &c.—	
		Turner ..... 42	
		MEDICAL AGENTS.—	
		Fieldhall, Limited ..... 45	
		Manchester Clerical, &c. Association ..... 45	
		Thomson, &c. ..... 45	
		Vale of Clwyd ..... 39	
		Warneford Asylum, Oxford ..... 37	
		Wye House, Buxton ..... 38	
		MEDICAL SCHOOLS.—	
		(LONDON) London School of Clinical Medicine ..... 35	
		University of London, University College ..... 35	
		West London Post-Graduate College ..... 35	
		NURSES' ASSOCIATIONS.—	
		Co-operation of Temperance Male and Female Nurses ..... 34	
		Female Nurses Association ..... 34	
		General Nursing Association ..... 35	
		Hospital for Sick Children ..... 35	
		London Nurses' Association ..... 35	

## TRADE AND MISCELLANEOUS ADVERTISEMENTS

AMBULANCES.—		CHEMISTS.—(Continued).	
St. John Ambulance—Invalid Carriages ..... 6		Christy & Co.—	
		Glycine Heroin ..... 31	
		Clay, Petrol & Co.—	
		Glycolic Acid ..... 30	
		Erasme Co.—Kinsol Medicated Toilet Soap ..... 30	
		Vilrons ..... 13	
		Gale & Co.—Elixir Cresolite c. Heroin Co. &c. ..... 30	
		H. K. Mulford Company—	
		Influenza Serobacterin ..... 25	
		Beppeps—	
		Urodonal ..... 11	
		Jubol ..... 11	
		Pageol, &c. ..... 11	
		Boggs & Son—	
		Protein Nerve Fond ..... 28	
		Hudson's Eumenthol Chemical Co.—Eumenthol Jujubes ..... 29	
		Humphrey Taylor & Co.—	
		Jutora ..... 44	
		Mahine Manufacturing Co.—	
		Malecine Verbene ..... Cover 1v	
		May & Baker—	
		Arsenobillon and Novarsenobillon ..... 7	
		Mertens—Adrenaline Oint ..... 7	
		Parke, Davis & Co.—	
		Liquor Sedans ..... 10	
		Raines & Co.—Slinger's Nutrients Suppositories ..... 28	
		Saccharin Corporation, Ltd.—	
		Iodo-povidone, Elbow, Digi oil ..... 8	
		Smith & Co.—	
		Hall's Wine ..... 29	
		Wilcox, Jozneau & Co.—	
		Rodine ..... 31	
		DISINFECTANTS.—	
		Boots Pure Drug Co.—	
		Chloramine-Ti ..... Cover 1ii	
		Condy's Fluid ..... 23	
		Timpson & Co.—	
		Jeyes' Sanitary Compounds Co.—	
		Jeyes' Fluid, &c. ..... Cover 1i	

		DISINFECTANTS.—(Continued).	
		Qulbell Bros.—	
		Kerol ..... 31	
		" Capsules ..... 31	
		FOODS.—	
		Allen & Hanbury—	
		Allensbury Diet ..... 16	
		Aylesbury Dairy Co.—	
		Humanized Milk ..... 28	
		Benger's Food ..... 23	
		Blatchley's Diabetic Preparations ..... 28	
		British Milk Products Co.—	
		Sacaphos ..... 12	
		Cadbury's Coco ..... 21	
		Udder Co.—	
		Liquid Peptonoids ..... Cover 1iv	
		Howlett & Son—	
		Virophos ..... 29	
		Hommel's Hematojen ..... 24	
		Valentine's Meat-Juice ..... Cover 1ii	
		FURNITURE, &c.—	
		Carter—	
		Furniture for Invalids and Hospital Supplies ..... 27	
		MED. & SURG. APPLIANCES.—	
		Bailey & Son—	
		Surgeons' Pocket Cases, &c. ..... 27	
		Davis—Luken's Sterile Catgut ..... 6	
		Dow Bros.—	
		Carrel's Apparatus for the Sterilisation of Suppurating Wounds ..... 21	
		Medical Supply Association—	
		Bergonié System of Treating Obesity ..... 32	
		MILLIKIN & LAWLEY—	
		Osteology, &c. ..... 32	
		ROBINS & SONS—	
		Gamgee Tissue ..... 6	
		TIMPSON & CO.—	
		Thermometers ..... 28	

		MINERAL WATERS, &c.—	
		Perrier ..... 28	
		OPTICIANS:	
		Watson & Sons—	
		Microscopes ..... 6	
		Hæmocytometers ..... 6	
		TAILORS, BOOTMAKERS, &c.—	
		Burberry—	
		Wea-proof, Topcoats, Suits, &c. ..... 6	
		Dowie & Marshall—	
		Hygienic Bootmakers ..... 28	
		Evans & Co.—	
		Lounge Suits ..... 6	
		Service Uniforms ..... 6	
		" JACKETS ..... 6	
		Slacks ..... 6	
		British Warm (lined Fleece) ..... 6	
		Bedford Cord Riding Breeches with Buckskin Strappings ..... 6	
		HARRY HALL—	
		Service Dress R.A.M.C. and Navy ..... 42	
		VARICOSE LYMPH.—	
		Chaumier's Calf Lymph ..... 28	
		Tenner Institute for Calf Lymph ..... 21	
		Ronner's Calf Lymph Establishment ..... 28	
		WINES, BEER, SPIRITS, &c.—	
		Ackerman Laurence—	
		Brut Royal ..... 32	
		Humphrey Taylor & Co.—	
		" G. B." Diabetes Whisky ..... 44	
		MISCELLANEOUS.—	
		1, Kirtlington road, Southampton—	
		Medical Lite ary Work ..... 42	
		No. 236, L.O. Strand—	
		Electric Multistat for sale ..... 43	

# THE LANCET.

No. 4873.

LONDON, SATURDAY, JANUARY 20, 1917.

Vol. CXCII.

## CONTENTS.

*The whole of the literary matter in THE LANCET is copyright.*

<b>THE BRADSHAW LECTURE</b> on Laminectomy in Gunshot Injuries of the Spinal Cord. Delivered before the Royal College of Surgeons of England on Dec. 15th, 1916, by Colonel CHARTERS J. SYMONDS, Q.B., A.M.S., M.S. Lond., F.R.C.S. Eng., a Vice- President of the College; Consulting Surgeon to Guy's Hospital; Consulting Surgeon to His Majesty's Forces. —(Illustrated).....	93	A Method for the Identification of Pure Organic Compounds. Vol. II. By Samuel Parsons Mulliken, Ph.D. .... 111	<b>PUBLIC HEALTH.</b>	<b>OBITUARY OF THE WAR:</b>
Gunshot Wounds of the Abdomen during the Siege of Kut. By C. H. BARBER, M.R.C.S. Eng., L.R.C.P. Lond., Major, Indian Medical Service.....	93	Organic Chemistry. By Victor von Richter. Vol. I. Newly translated and revised from the German edition (after Professor Edgar F. Smith's third American edition) by Percy H. Spielmann, Ph.D., B.Sc., F.I.C., A.H.C.Sc., .....	Annual Reports of Medical Officers of Health ..... 118	Ernest Howe, M.B., Ch.B. Vic., Lieutenant, Royal Army Medical Corps.— (With Portrait) ..... 125
The Phenomena of Anaphylaxis. By S. WYATT, M.D., B.S. Lond., M.R.C.P., Captain, Royal Army Medical Corps ...	105	Analytical Chemistry. Based on the German text of F. P. Treadwell, Ph.D. Translated and revised by William T. Hall, S.B. Vol. I. Fourth English, after the eighth German, edition.....	Annual Reports from India..... 118	Benjamin Richard Roberts, L.G.C.P. & S.Edin., L.F.P.S. Glasg., Lieutenant, Royal Army Medical Corps.— (With Portrait) ..... 125
Traumatic Rupture of the Jejunum; Operation; Recovery. By W. SAMPTON HANDLEY, M.S. Lond., F.R.C.S. Eng., Surgeon to the Middlesex Hospital.....	109	Journal of Physiology. Edited by J. N. Langley, Sc.D., F.R.S. Vol. L, No 5 ..... 111	<b>URBAN VITAL STATISTICS:</b>	<b>OBITUARY.</b>
<b>ORIGINAL ARTICLES.</b>		Journal of Cancer Research..... 112	English and Welsh Towns.... 119	Jean Baptiste Auguste Chauveau.—(With Portrait) .. 121
Gunshot Wounds of the Abdomen during the Siege of Kut. By C. H. BARBER, M.R.C.S. Eng., L.R.C.P. Lond., Major, Indian Medical Service.....	93	<b>LEADING ARTICLES.</b>	Scooth Towns ..... 119	Mary Birrell Davies, L.R.C.P., L.G.C.S. Edin., L.F.P.S. Glasg..... 122
The Phenomena of Anaphylaxis. By S. WYATT, M.D., B.S. Lond., M.R.C.P., Captain, Royal Army Medical Corps ...	105	<b>MOBILISATION OF THE MEDICAL PROFESSION</b> ..... 113	Irish Towns..... 119	<b>MEDICAL NEWS.</b>
Traumatic Rupture of the Jejunum; Operation; Recovery. By W. SAMPTON HANDLEY, M.S. Lond., F.R.C.S. Eng., Surgeon to the Middlesex Hospital.....	109	<b>TETANUS AND THE USE OF PROTECTIVE SERUM</b> ..... 114	Vital Statistics of London during December, 1916..... 119	South African Pharmaceutical Diploma ..... 109
<b>REVIEWS AND NOTICES OF BOOKS.</b>		<b>ANNOTATIONS.</b>	Analysis of Sickness and Mortality Statistics in London during December, 1916 ..... 120	Royal College of Surgeons of England ..... 112
An Introduction to Neurology. By C. Judson Herrick ..... 110		New Food Orders ..... 114	<b>THE WAR.</b>	Centenarians ..... 116
A Practical Guide to X Rays, Electro-therapeutics, and Radium Therapy. By A. R. Walter, M.R.C.S., L.R.C.P. Lond., Major, Indian Medical Service ..... 110		The Moritz-Weiss Reaction in Surgical Practice ..... 115	The Casualty List ..... 125	London Hospital Medical Col- lege ..... 117
Cleft Palate and Hare Lip. By Sir W. Arbuthnot Lane, Bart., M.S. Lond., F.R.C.S. Eng. Third Edition ..... 110		Double Empyema Successfully Operated upon ..... 115	Deaths among the Sons of Medical Men ..... 125	A Rural Organisation Council.. 122
Roentgenographic Diagnosis of Dental Infection in Systemic Diseases. By Sinclair Toussay, A.M., M.D. .... 110		Trichomonas Dysentery at Arequipa ..... 116	The Honours List ..... 125	Examining Board in England by the Royal Colleges of Phy- sicians of London and Sur- geons of England: Pass list... 126
A System of Physical Chem- istry. By William O. McC. Lewis, M.A. & U.I., D.Sc. Liverp. In two volumes ..... 110		Two South African Medical Men 116	The Central Medical War Committee ..... 126	Letterkenny Medical Officer- ship ..... 126
A Text-book of Organic Chemistry for Students of Medicine and Biology. By H. V. McCollum, Ph.D. .... 110		A War-time Pathological Museum ..... 116	The Supply of Knitted Articles for the Forces ..... 126	Royal Institute of Public Health ..... 126
<b>SPECIAL ARTICLES.</b>		<b>SPECIAL ARTICLES.</b>	The Edith Cavell Homes of Rest for Nurses ..... 126	<b>INDEX.</b>
The Control of Venereal Diseases: The Midwife's Share in Informal Notification of Syphilis.—The Suppression of Unqualified Practice.— Galy as an Approved Salvarsan Substitute.—Death acceler- ated by a Salvarsan Substitute.—Campaign of Publicity.—Council and Other Schemes ..... 117		The New Ontario Military Hospital ..... 126	The Health of the German Army ..... 126	VOL. II, 1916 ..... iii.-xxiv.
The Services ..... 120		Health of the German Army ..... 126	Appointments.—Vacancies ..... 127	

FOR INDEX TO ADVERTISEMENTS SEE PAGE 2.

**JOHN BALE, SONS & DANIELSSON, LTD.,**  
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## INDEX

## **MEDICAL AND OTHER BOOKS AND PUBLICATIONS**

<b>BAILLIÈRE, TINDALL &amp; COX:—</b>	PAGE	FROWDE AND	PAGE	LEWIS & CO.—(Continued).	PAGE	SAUNDERS CO.—(Continued).	
Munro Kerr's Operative Midwifery.		HODDER & STOUGHTON:—		Starr—The Adolescent Period .....	3	Delac—Principles and Practice of Obstetrics .....	1
Thorne-Nauheim Treatment of Diseases of the Heart and Circulation in England.	Cover	Waring—Surgical Diseases of the Gall-Bladder, &c. ....	Cover	Hygiene of the Nursery .....	3	Dorland's Illustrated Medical Dictionary .....	1
HILTON & CO.:—		Ghosh's <i>Materia Medica</i> .....	4	White—Occupational Affections of the Skin .....	3	Morrow—Diagnostic and Therapeutic Techniques .....	5
KIMPTON:—		Roth—Military Orthopaedics Cover		Young—The Mentally Defective Child .....	3	Moynihan, Sir B.—Abdominal Operations .....	5
Lewis & CO.:—		ARMSTRONG—I. K. Therapy, with Special Reference to Tuberculosis .....	3	MACMILLAN & CO.:—		Scudder—Treatment of Fractures .....	5
Hare—Alcoholism: Its Clinical Aspects and Treatment.	Cover	Bardawill—Treatment of Pulmonary Tuberculosis .....	3	Tubby—Deformities .....	Cover	WRIGHT & SONS (Baird):—	
Squire's Companion to the British Pharmacopœia .....	Cover	Bennett— <i>Materia Medica</i> , &c. ....	3	Lane, Sir A.—Operative Treatment of Fractures .....	Cover	Porter—Diseases of the Throat, Nose, & Ear .....	4
DANIËL:—		Huxton—Anæsthetics .....		NISBET & CO.:—			
Rabagliati—Initis or Nutrition and Exercises .....	4	Davidson—Localization by X-Rays and Stereoscopy .....	3	Romer and Creasy—Bonesetting, &c. ....	Cover		
		Lewis's Charts .....		SAUNDERS COMPANY:—			
				Ander—Practice of Medicine ....	5	Baker—Books .....	4
				DaCosta—Modern Surgery .....	5	Behnke—Stammering, &c. ....	4
						Ketley—Stammering .....	4
						Matthews-Wood—Application of Trusses to Hernia .....	1

## **OFFICIAL AND GENERAL ANNOUNCEMENTS**

ASSISTANTIES, MEDICAL	12
ASYLUMS, HOMES, &c.	
Ashwood House, Kingwinford	45
Barnwood House Hospital	46
Bishopstone House, Bedford	45
Bruntoun House, Lancaster	45
Camberwell House, Peckham-road	48
Cheadle Royal	46
Clarence Lodge, Clapham Park	49
Colthurst House School, Alderley Edge	49
Coppice, The, Nottingham	46
Dalrymple House, Rickmansworth	48
David Lewis Colony, Alderley Edge	49
Duft House, Banff	
General Manager, Craven street	50
Ghyllwood Sanatorium	
Grove House, Church Stretton	48
Grove Tree Cottages, Norwich	48
Hasthwaite Nursing Home	50
Haydock Lodge, Newton-le-Willows	47
Heigham Hall, Norwich	
Homes for Inebriate Women	48
Littleton Hall, Brentwood	50
London Fever Hospital	46
Malling Place, Kent	46
Melbourne House, Leicester	46
Mendip Hills Sanatorium	48
Moat House, Tamworth	46
Newmains Retreat, Lanarkshire	48
Newhaugh Hall, Polton, Midlothian	47
ASYLUMS	(Continued).
Nordrach-on-Dee, Banchory	49
Northumberland House, Finsbury Park	47
Northwoods House, Winterbourne	47
Otto House, West Kensingston	46
Peckham House	47
Pendymry Hall Sanatorium, Nor-trach-in-Wales	48
Plymouth House, Plympton	46
Plymouth Corporation Mental Hospital	45
Royal Earlswood Institution for Mental Defectives	47
St. Andrew's Hospital, Doffs Hill	50
St. Andrew's Hos., Northampton	46
St. George's Retreat, Burgess Hill	48
Springfield House Private Asylum, Bedford	45
Stretton House, Church Stretton	46
The Grange, near Rotherham	48
Vale of Clwyd Sanatorium	48
Warneford Asylum, Oxford	45
Wye House, Buxton	46
FINANCIAL, &c.—	
Equitable Revolutionary Interest Society	45
HEALTH RESORTS, BATHS, &c.—	
Alexandra Therapeutic Institute	49
Caterham Sanitarium	49
Droitwich Brine Baths	49
Smedley's, Matlock	49
HOSPITAL, INFIRMARY, SANATORIUM, &c., VACANCIES	50 52
HOUSE & ESTATE AGENTS	-
Bedford & Co., Wigmore-street	53
Elliott, Son & Boyton, Vere-street	53
Ley Clark, Wimpole-street	53
LIFE & FIRE ASSURANCES, &c.—	
General Life Assurance Co.	43
National Provident Institution	43
Prudential	43
MASSAGE	-
Associated Male Nurses and Massaurs	45
Sharman	45
MEDICAL ACCOUNTANTS, &c.—	
Turner	53
MEDICAL AGENTS	-
Fieldhall, Limited	55
Manchester Clerical, &c., Assoc.	53
Medical Agency	55
Needier, J. C.	55
Peacock & Hadley	55
Turner	53
MEDICAL SCHOOLS	-
(LONDON.)	
London School of Clinical Medicine	43
West London Post-Graduate College	43
NURSES' ASSOCIATIONS	-
Co-operation of Temperance Male and Female Nurses	44
NURSES' ASSOC. (Continued).	
Female Nurses Association	44
General Nursing Association	44
Hospital for Sick Children	43
London Nurses' Association	44
London Temperance Nurses Co-operation	44
Male Nurse Temperance Co-operation	44
Maternal Nurses' Association	45
Menial Nurses' Co-operation	45
Nurses' Association	45
Nurses' Co-operation	45
Registered Nurses' Society	44
St. John's House	43
St. Luke's Hospital	43
Temperance Association of Male Nurses, Ltd.	44
The Retreat, York	44
OFFICIAL NOTICES	-
City of London Lying-in Hospital	45
London Hospital	43
London School of Tropical Medicine	43
Queen Charlotte's Lying-in Hospital	43
PARTNERSHIPS & PRACTICES	52
RAILWAY & STEAMSHIP CO.'S	-
New Zealand Shipping Co.	43
TUTORS & LECTURERS	-
Medical Correspondence College	43
Weymouth	43

## **TRADE AND MISCELLANEOUS ADVERTISEMENTS**

<b>AMBULANCES</b> —	
St. John Ambulance — Invalid Carriages .....	42
<b>BOTTLE MERCHANTS</b> —	
Isaac .....	38
<b>CARRIAGES, MOTORS, &amp;c.</b> —	
Armstrong Liveries .....	42
Sabrook Bros.	
R. M. C. Coupe .....	53
<b>CHEMISTS &amp; DRUGGISTS</b> —	
Allen & Hanburys—	
Allenburys Cod-Liver Oil .....	21
Bynol .....	21
Bynol Emulsion .....	21
Solurol .....	18
Anglo-French Drug Co.—	
Neocaine-Surreniline .....	28
Iodargol .....	28
Antikamnia Chemical Co.—	
Antikamnia Tablets .....	32
Antiphlogistine .....	27
Battley & Watt—	
Battley's Liquors .....	30
Boots Pure Drug Co.—	
Aspirin .....	10
British Drug Houses Ltd.—	
Intramine .....	18
British Oxygen Co.—	
Oxygen .....	38
British Proprietors—	
Sanatoriums .....	11
Buntingford's Wollcome & Co.—	
Alcoholic Extract of Guinea Pig's Heart with Cholesterol .....	24
Kharo-iran, &c. ....	24
Ammoniated Quinine, &c. ....	25
Emetine Blausithetur Iodide .....	29
Christy & Co.—	
Glyco-Thymoline .....	31
Glyco-Heroin .....	32
Cook & Co.—	
Cocfeataint Lozenges .....	Cover 11
Crookes' Laboratories—	
Collolsols .....	Cover IV
Erasme Co.—Kinsol Medicated Toffee Soap .....	38
Etablissements Poulenot Freres—	
Stovaine .....	7
Fairchild Bros. & Foster—	
Pepple Digestive Products .....	15
Fellowes Medical Manf. Co.—	
Fellowes' Syrup .....	7
<b>CHEMISTS</b> —(Continued).	
Gale & Co.—Elixir Cresolis c.	
Herolin Co., &c. ....	39
Hepplews—	
Urodonas .....	14
Lambert Pharmaceutical Co.—	
Lipertine .....	Cover III
Malline Manufacturing Co.—	
Malline with Cascara Sagrada .....	23
Marshall & Sons—	
Pulverised Aspirin .....	38
New York Pharmaceutical Co.—	
Hayden's Viburnum Compound .....	33
Parks, Davis & Co.—	
Polaccine .....	17
Hay Fever Reaction Outfit .....	17
Raines & Co.—Slinger's Nutritive Suppositories .....	39
Richards & Sons—	
Lactopeptine .....	30
Sachariah Corporation, Ltd.—	
Dial, Coagulin, Yohimbine .....	13
S. P. Charges Co.—	
Subphaque .....	38
Squire & Sons—	
Glyph cal, &c. ....	22
Vinolia Co.—	
Royal Vinolia Cream .....	9
Wilcox, Jozean & Co.—	
Kola Astier .....	36
<b>DISINFECTANTS</b> —	
Condyl's Fluid .....	36
Willows, Francis, Butler & Thompson-Lysol .....	32
<b>FOODS</b> —	
Allen & Hanburys—	
Allenburys Foods .....	20
Benger's Food .....	12
Blatchley's Diabetic Preparations .....	41
Brand & Co.—	
Essence of Beef .....	41
Cafoln Co.—Cafoln .....	40
Carlard & Co.—Diabetic Foods .....	40
Carrnick & Co.—	
Liquid Peptonoids .....	28
Fried Malted Cocoa .....	Cover III
Hewlett & Son—	
Viphros .....	40
Horlick's Malted Milk Co.—	
Malted Milk Tablets .....	33
<b>FOODS</b> —(Continued).	
Manhu Food Co.—	
Manhu Distinctive Foods .....	41
Pan Yan Pickle .....	40
Savory & Moore—	
Peptonised Milk Preparations .....	54
Southall Bros. & Barclay—	
Vitaner .....	41
Valentine's Meat-Juice .....	Cover II
Vi-Coco .....	41
Wander, Ltd.—Ovaltine .....	16
<b>FURNITURE, &amp;c.</b> —	
Carter—Furniture for Invalids and Hospital Supplies .....	35
Hampton & Sons—	
English Furniture, &c. ....	53
<b>MED. &amp; SURG. APPLIANCES</b> —	
Bailey & Son—	
Invalid Carriages and Chairs for Wounded Soldiers .....	27
Davis-Lukens Sterile Catalog .....	6
Dow Bros.—Differential Stethoscopes .....	35
Hoentke—	
Extension Appliances .....	28
Milkin & Lawley—	
Osteology, &c. ....	Cover III
Precious Metals Tempering Co.—	
Tempered Gold Hypodermic Needles .....	37
Robinson & Son—Gauze Tissue	
Schaefer—Hawley's Patented New Operiatric Table, &c. ....	42
Thermogene Co., Ltd.—	
Thermogene Curative Wadding .....	34
Timpson & Co.—Thermometers .....	36
Zeal—Repello Clinical Thermometer .....	6
<b>MINERAL WATERS, &amp;c.</b> —	
Cheltenham Natural Aperient Water .....	39
Hong-a Son—	
Lithia Waters .....	39
Iridis & Co.—Tonalk .....	54
Vichy-Célestine .....	34
<b>OPTICIANS</b> —	
Bausch & Lomb Optical Co.—	
Centrifuges .....	4
Watson & Sons—	
Microscopes .....	42
<b>SANITARY APPLIANCES, &amp;c.</b> —	
Award Patent Milk Sterilizer .....	41
Berkelfield Filter .....	43
<b>STATIONERY, &amp;c.</b> —	
Mable, Todd & Co.—	
Swan Pen .....	36
<b>STOVES, &amp;c.</b> —	
British Commercial Gas Association—Gas Heating .....	8
<b>TAILORS, BOOTMAKERS, &amp;c.</b> —	
Burberry—	
The Burberry .....	37
Weatherproof, Topcoats, Suits, &c. ....	42
Harry Hall—	
Service Dress R.A.M.C. and Navy .....	42
Holland—Special Boots for the Maimed .....	6
<b>TOBACCO, CIGARS, &amp;c.</b> —	
Player & Sons—	
Perfectos Cigarettes .....	6
<b>TYPEWRITING, &amp;c.</b> —	
Yost Typewriter Co.—	
Yost .....	37
<b>VACCINE LYMPH</b> —	
Chaumier's Calf Lymph .....	6
Jenner Institute for Calf Lymph .....	6
<b>WINES, BEER, SPIRITS, &amp;c.</b> —	
Tuckey & Co.—	
Pure Malt Whisky .....	41
Liqueur Scotch Whisky .....	41
<b>X-RAY, &amp;c., APPARATUS</b> —	
Medical Supply Association—	
The Galvanoset .....	38
<b>MISCELLANEOUS</b> —	
No. 232, L.O. Strand—	
Shorthand Typist .....	52
No. 242, L.O. Strand—	
Secretary .....	52

# THE LANCET.

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LONDON, SATURDAY, JANUARY 27, 1917.

Vol. CXCII.

## CONTENTS.

*The whole of the literary matter in THE LANCET is copyright.*

**AN ANALYSIS** of Recent Cases of Tetanus in the British Expeditionary Force, with Special Reference to their Treatment by Antitoxin. By Sir WILLIAM B. LEISHMAN, C.B., F.R.S., F.R.C.P., LL.D., K.H.F., Colonel, Army Medical Service; and A. B. SMALLMAN, D.S.O., M.D., D.P.H., Major, Royal Army Medical Corps.—(Illustrated) ..... 131

### ORIGINAL ARTICLES.

Modified Tetanus. By H. BURROWS, M.B., B.S.Lond., F.R.C.S. Eng., Captain, Royal Army Medical Corps (T.F.)—(Illustrated) ..... 139

Weil's Disease (Spirochetales Ictero-hemorrhagica) in the British Army in Flanders. By A. STOCKS, M.D. Dub., F.R.C.S. Engl., Captain, Royal Army Medical Corps; J. A. RYLE, M.B., B.S.Lond., Captain, Royal Army Medical Corps, Special Reserve; and W. H. TUTTLE, Captain, Canadian Army Medical Corps.—(Illustrated) ..... 142

Toxic Jaundice in Munition Workers. By MATTHEW J. STEWART, M.B., Ch.B.Glasg., M.R.C.P. Lond., Captain, Royal Army Medical Corps (T.F.); Pathologist to the East Leeds War Hospital ..... 153

### REVIEWS AND NOTICES OF BOOKS.

Gynaecology. By William P. Graves, A.B., M.D. ..... 155

Raymond, or Life and Death. By Sir Oliver J. Lodge ..... 156

Text-book of Nervous Diseases for the Use of Students and Practitioners of Medicine. By Charles L. Dana, A.M., M.D., LL.D. Eighth edition 156

A Glossary of Botanic Terms, with their Derivation and Accent. By Benjamin D. Jackson. Third edition ..... 156

Surgical Operations with Local Anesthesia. By Arthur H. Hertzler, A.M., M.D. Second edition ..... 156

Fleas as a Menace to Man and Domestic Animals: their Life history, Habits, and Control. By James Waterston, B.D., B.Sc. Economic Pamphlet, No. 3 ..... 156

### LEADING ARTICLES.

THE PROBLEMS OF TETANUS.... 157

THE PRACTICE OF MASSAGE.... 158

### ANNOTATIONS.

Toxic Jaundice ..... 159

The Explosion in East London ..... 159

Flavine ..... 159

Diabetes Insipidus and Lesions of the Posterior Lobe of the Pituitary Body ..... 160

Child Welfare Work ..... 160

Epidural Intraspinal Abscess of Metastatic Origin ..... 160

### SPECIAL ARTICLES.

The Control of Venereal Diseases: Public Meeting in Belfast—Council and Other Schemes—Enlightenment Campaign ..... 156

Paris: Recrudescence of Rabies.—Professional Re-education of Soldiers.—Poisoning by Motor gas in Ambulances.—Increase of Consultation Fees.—Reinforced Quinine Treatment of Malaria ..... 161

The Services ..... 162

VITAL STATISTICS:

Vital Statistics of England and Wales for 1916 ..... 162

Urban Vital Statistics ..... 162

### CORRESPONDENCE.

The Prophylaxis of Venereal Diseases (Sir H. Bryan Donkin) ..... 163

The Phenomena of Anaphylaxis (Dr. Frederic Thomson, Dr. Miles B. Arnold) ..... 163

Definition of Acute Alcoholism (Dr. Chalmers Watson) ..... 164

A Plea for the General Use of Pneumatic Tourniquets (Professor Kenelm H. Digby) ..... 164

The Ause of Trench-Foot (Captain V. T. Caruthers, R.A.V.C.) ..... 164

The Treatment of Trench-Foot (Dr. George Cooper) ..... 164

Munition Work and Child Welfare (Dr. H. Cameron Kidd) ..... 165

The Prevention of Venereal Disease (Dr. Robert B. Routoul) ..... 165

The Nomenclature of "Internal Secretion" (Professor Sir H. A. Schäfer) ..... 165

The Official Visit to the Field Building (Sir Theodore Cook) ..... 165

Massage and Medical Electricity in the After-treatment of Convalescent Soldiers (Dr. Edwin L. Ash) ..... 166

The Localization of Foreign Bodies (Lieut. Percy Perrow, S.A.M.C.)—(Illustrated) ..... 166

Pilewort ..... 169

The Conservative Treatment of Burns and Scalds (Mr. G. J. O'Beily) ..... 170

The Abbé Guo on Pediculosis (Mr. S. Shore Nightingale) ..... 170

### THE WAR.

The Casualty List ..... 166

The Honours List ..... 166

Mentioned in Despatches ..... 166

Deaths among the Sons of Medical Men ..... 167

Red Cross Work in the County of London ..... 167

The Welfare of Women Workers ..... 167

Scottish Women's Hospitals: Calcutta Unit ..... 167

Rest house for Sailors and Soldiers ..... 167

The Supply of Wine to the French Soldier ..... 167

### OBITUARY OF THE WAR:

Roderick Campbell McLeod, M.D. New York, Lieutenant Colonel, Canadian Army Medical Corps ..... 168

### OBITUARY.

Duncan Burgess, M.A., M.B. Cantab., F.R.C.P. Lond. ..... 167

George Munro Smith, M.D. Bristol (hon. causa) ..... 167

Charles Matthew Brady, L.R.C.S.I. ..... 167

### MEDICAL NEWS.

Medical Sicknes, Annuity, and Life Assurance Friendly Society ..... 168

Letterkenny Medical Officership ..... 168

Edinburgh Royal Infirmary ..... 168

Royal College of Physicians of Edinburgh, Royal College of Surgeons of Edinburgh, and Royal Faculty of Physicians and Surgeons of Glasgow: Pass list ..... 168

Royal Society of Arts ..... 168

Central Midwives Board ..... 168

Centenarians ..... 168

Memorial to the late Mr. E. L. Swan ..... 168

### INDEX.

VOL. II., 1916 ..... iii.-xxv.

#### TITLE-PAGE.

(See Notice on p. 161)

Appointments.—Vacancies ..... 168

Births, Marriages, and Deaths ..... 169

Meteorological Readings ..... 169

Notes, Short Comments, and Answers to Correspondents ..... 169

Medical Diary ..... 171

Editorial Notices ..... 171

Manager's Notices ..... 171

Acknowledgment of Communications received ..... 171

FOR INDEX TO ADVERTISEMENTS SEE PAGE 2.

## JOHN BALE, SONS & DANIELSSON, LTD.

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## INDEX

## MEDICAL AND OTHER BOOKS AND PUBLICATIONS

PAGE		PAGE		PAGE		PAGE	
<b>ARNOLD</b> —		<b>CHURCHILL</b> —(Continued).		<b>LEWIS &amp; CO.</b> —		<b>SAUNDERS CO.</b> —(Continued).	
Sibley—Diseases of Skin .. Cover 1		Hartridge—Ophthalmoscope .. 5		Elliot—Glaucoma .. Cover 1		Ruhrlin—Diseases of Children .. 5	
<b>BAILLIERE, TINDALL &amp; COX</b> —		Hull—Retraction of the Eye .. 5		Moullin—Enlargement of Prostate .. Cover 1		Saunders' Practical Manuals .. Cover 1	
Freyer—Enlargement of the prostate .. Cover 1		Jellett—A Short Practice of Gynaecology .. 5		Saxe—Examination of Urine .. 5		Stevens—Practice of Medicine .. 5	
Freyer—Surgical Diseases of the Urinary Organs .. Cover 1		Latham and Torrens—Medical Diagnosis .. 5		Todd—Clinical Diagnosis .. 5			
Gardner—Manual of Surgical Anesthesia .. Cover 1		Robin's Treatment of Tuberculosis .. 5					
Lockhart-Mummery—Diseases of the Colon .. Cover 1		System of Treatment .. 4					
<b>BALE, SONS &amp; DANIELSSON</b> —		Thorne, Bayly—Schott Methods of Treatment of Chronic Diseases of the Heart .. 4		<b>NISBET &amp; CO.</b> —			
Cornet—Tuberculosis in Children .. 1		Romer and Creasy—Bone-setting and the Treatment of Painful Joints .. 4		Romer and Creasy—Bone-setting and the Treatment of Painful Joints .. 4			
Defective Children .. 1							
The Child Welfare Annual .. 1		<b>DANIEL</b> —					
Worth—Squint: its Causes, Pathology and Treatment .. Cover 1		Rabagliati—Initia or Nutrition and Exercises .. 4		<b>SAUNDERS COMPANY</b> —			
<b>CHURCHILL, J. &amp; A.</b> —				Coolidge—Diseases of the Nose and Throat .. 5			
Cushny—Pharmacology, &c. .. 3				Davis—Obstetrics .. 5			
Eden—Manual of Midwifery .. 3				Dercum—Mental Diseases .. 5			
Eden and Lockyer—Gynaecology .. 3				Gleason—Nose, Throat, and Ear .. 5			
Hardwicke—Sight-Testing Made Easy .. 3				Hill—Histology .. 5			

## OFFICIAL AND GENERAL ANNOUNCEMENTS

<b>ASSISTANCES, MEDICAL</b> .. 48	<b>ASYLUMS</b> —(Continued).	<b>MASSAGE</b> —	<b>NURSES' ASSOC.</b> —(Continued).
<b>ASYLUMS, HOMES, &amp;c.</b> —	Peckham House .. 44	Associated Male Nurses and Massieurs .. 41	New Mental Nurses' Co-operation .. 42
Ashwood House, Kingswinford .. 42	Pandyford Hall Sanatorium, Nor- drach-in-Wales .. 45	Cutter .. 48	Nurs's Association .. 41
Aspid House Hospital .. 43	Plimpton House, Plympton .. 45	Sharmar .. 42	Nurses' Co-operation .. 42
Bishopstone House, Bedford .. 43	Portsmouth Corporation Mental Hospital .. 42		St. John's House .. 42
Brunton House, Lancaster .. 42	St. Andrew's Hospital, North- ampton .. 43		St. Luke's Hospital .. 41
Camberwell House, Peckham-road .. 44	Shaftesbury House, Formby-by-the-Sea .. 41		Temperance Association of Male Nurses, Ltd. .. 41
Clarence Lodge, Clapham Park .. 42	Springfield House Private Asylum, Bedford .. 42		The Retreat, York .. 42
Coithurst House School, Alderley Edge .. 42	Stretton House, Church Stretton .. 45		
Coppice, The, Nottingham .. 43	The Grange, near Rotherham .. 45		<b>OFFICIAL NOTICES</b> —
Dalrymple House, Rickmansworth .. 44	Vale of Clwyd Sanatorium .. 45		City of London Lying-in Hos- pital .. 46
Dartmoor Sanatorium .. 45	Warneford Asylum, Oxford .. 42		Incorporated Society of Trained Massieurs .. 40
David Lewis Colony, Alderley Edge .. 42	Wye House, Buxton .. 45		London Hospital .. 40
Duff House, Banff .. 43			London School of Tropical Medi- cine .. 40
General Manager, Craven street .. 46			Medical Sicknes, Annuity, and Life Assuance Friendly Society .. 40
Ghyllwood Sanatorium .. 45			Queen Charlotte's Lying-in Hos- pital .. 40
Grove House, Church Street .. 45			Theodore Williams Medical Scholarship .. 49
Grove, The, Catton, Norwich .. 45			York road General Lying in Hos- pital .. 40
Haslemere Nursing Home .. 46			
Haydock Lodge, Newton-le-Willows .. 42			<b>PARTNERSHIPS &amp; PRACTICES</b> .. 48
Heights Hall, Newbiggin .. 44			<b>RAILWAY &amp; STEAMSHIP CO.</b> —
Homes for Inebriate Women .. 45			New Zealand Shipping Co. .. 40
London Fever Hospital .. 45			Royal Mail Steam Packet Co. .. 40
Malling Place, Kent .. 43			
Melbourne House, Leicester .. 44			<b>TUTORS &amp; LECTURERS</b> —
Mendip Hills Sanatorium .. 46			Schnelle—Stammering .. Cover 1
Moat House, Tamworth .. 45			Weymouth .. 40
Newmans Retreat, Lanarkshire .. 44			
Nordrach-on-Dee, Bancory .. 45			
Northumberland House, Finsbury Park .. 43			
Northwoods House, Winterbourne 44			

## TRADE AND MISCELLANEOUS ADVERTISEMENTS

<b>AMBULANCES</b> —	<b>CHEMISTS</b> —(Continued).	<b>DISEINFECTANTS</b> —	<b>MINERAL WATERS</b> , &c.—
St. John Ambulance—Invalid Carriages .. 39	Christy & Co.—	Condyl's Fluid .. 58	Perrier .. 36
<b>BOTTLE MERCHANTS</b> —	Glyco-Horin .. 35	Evans Sons Leescher & Webb—	
Irane .. 38	Clay, Fagot & Co.—	Lysol Evans .. 15	
<b>CARRIAGES, MOTORS, &amp;c.</b> —	Glycolactoph .. 32	Quibell Bros.—	Watson & Sons—
Armstrong— Chauffeurs', Coachmen's, Foot-men's Liveries .. 38	Cook & Co.—	Kerol .. 35	Microscopes .. 7
Oxford & Sons—Ford Cars .. 39	Coffeant Lozenges .. Cover 11	Sanitas Co.—	
<b>CHEMISTS &amp; DRUGGISTS</b> —	Erasme Co.—Kinsol Medicated Toilet Soap .. 32	Sanitas Fluid, &c. .. 28	
Allen & Hanburys—	Evans Sons Leescher & Webb—		<b>OPTICIAN</b> —
Argein, Kavol, Cystosol .. 18	Glyco-Horin .. 35		Watson & Sons—
Bynoe Christol .. 19	Gale & Co.—Elixir Cresolis c. Heroin Co., &c. .. 35		
Christol .. 19	Heppelis—		
“ Capsules .. 19	Urodonal, Jubol, Globol, &c. .. 17		
“ Confection .. 19	Hewlett & Son—		
“ Emulsion .. 19	Met. Diamond Co. .. 30		
Bynogen .. Cover 14	Hogg & Son—		
Alienbrys Castor Oil .. 32	Hotchpotch Serve Food .. 37		
Vapo-Resoleone .. 58	Hudson's Eumenthol Chemical Co.—Eumenthol Tooth Powder. 24		
Angier Chemical Co.—	Humphrey Taylor & Co.—		
Angier's Emulsion .. 12	Junior—		
Anglo-French Drug Co.—	Maitine Manufacturing Co.—		
Cuprase .. 25	Maitne with Phos. Iron, Quinia, and Strichnia .. 21		
Serume .. 25	Maitline with Piophathene .. 21		
Inhaler Vial .. 25	Martindale—		
Para-Tetan. ne, &c. .. 25	Emetine-Bleometh-Iodide .. 20		
Battley & White—	Paraffin "No. 7" .. 20		
Liquid Opium Sedativus .. Cover 111	May & Baker—		
Brown & Purse Drug Co.—	Arsenobillon and Novarseno-billon .. 11		
Aspirin .. 28	Mertens—		
British Organotherapy Co.—	Electric Colloidal Metals .. 9		
Ovamammol Compound .. 11	Protosol .. 14		
British Oxygen Co.—	Raines & Co.—Slinger's Nutrient Suppositories .. 14		
Oxygen .. 32	Sarcinari Corporation, Ltd.—		
Browning & Co.—Semprolin Emul-sion with Salol .. Cover 111	Peristostil ..		
Burroughs Wellcome & Co.—	Salen ..		
Kepier Matl. Ext. act with Hemoglobin, &c. .. 22	Salicin ..		
Extract and Creosote .. 22	Van Ufford ..		
Hexamine .. 25	Smith & Co.—Hall's Wine .. 37		
Nizin .. 25	Tidman's Sea Salt .. 32		
Aspirin .. 24	Wilson, Joseph & Co.—		
Sodium Salicylate .. 24	Arbol .. 34		
	Nativelle's Crystallised Digi-taline .. 34		

# THE LANCET.

No. 4875.

LONDON, SATURDAY, FEBRUARY 9, 1917.

Vol. CXCII.

## CONTENTS.

*The whole of the literary matter in THE LANCET is copyright.*

HUNTERIAN LECTURE on the Bladder in Gunshot and Other Injuries of the Spinal Cord. Delivered at the Hunterian Society, by J. W. THOMSON WALKER, M.B. Edin., F.R.C.S. Eng., Surgeon to the King George Hospital; Consulting Urologist to the Star and Garter Hospital; Assistant Surgeon to St. Peter's Hospital.—(Illustrated) 173

### ORIGINAL ARTICLES.

A Method of Concentrating Entamoeba Cysts in Stools. By J. W. CROPPER, M.B., M.Sc. Liverp., and E. W. HAROLD ROW, B.Sc., F.L.S., F.Z.S., Assistant Lecturer and Demonstrator in Zoology in the University of London, King's College.—(Illustrated) 179

A Case of Suppurative Meningitis with Glycosuria Simulating Diabetic Coma. By FRANK H. TAYLOR, M.D., B.S., M.R.C.P. Lond., F.R.C.S. Eng., D.P.H. Camb., Pathologist and Bacteriologist to the Queen Alexandra Military Hospital, Millbank; Lecturer on Bacteriology, University of London, King's College; and W. H. MCKINSTRY, M.B., Q.M. Glasg., D.P.H. Lond., Temp. Captain, R.A.M.C.—(Illustrated) 182

The Recurrent Type of "Trench" Fever in Mesopotamia. By G. F. COOMBS, M.D. Lond., M.R.C.P. Lond., Captain, R.A.M.C. (T.F.); lately Attached to Indian Expeditionary Force "D."... 183

A Preliminary Contribution on "P.U.O. (Trench Fever)." By P. O. DAVIES, M.B. Camb., M.R.C.P. Lond., Captain, R.A.M.C. (T.O.); Temporary Officer in Charge, Medical Division, No.—General Hospital; and R. P. WELDON, L.R.C.P. & S. Ire., Captain, R.A.M.C. (T.O.); Pathologist, No.—General Hospital.... 183

### CLINICAL NOTES:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

Acute Pneumonia with Hyperpyrexia, followed by Heart-block. By J. PORTER-PARKINSON, M.D. Lond., F.R.C.S. Eng., Senior Physician at the London Temperance Hospital and at the Queen's Hospital for Children, Hackney-road, E..... 182

A Case of Foreign Body in the Rectum. By N. S. BOYARD, M.D., late Senior House Surgeon, French Hospital, London; Surgical Officer, the London Lock Hospital..... 185

### MEDICAL SOCIETIES.

ROYAL SOCIETY OF MEDICINE: SECTIONS OF MEDICINE, PATHOLOGY, AND EPIDEMIOLOGY: Discussion on Toxic Jaundice in Munition Workers..... 185

### REVIEWS AND NOTICES OF BOOKS.

The Diagnosis and Treatment of Heart Disease. By B. M. BROOKBANK, M.D. Vict., F.R.C.P. Lond. Second edition 187

Clinical Disorders of the Heart. By Thomas Lewis, M.D. Lond., F.R.C.P. Lond. Third edition..... 187

The Cure of Obesity and Obese Heart. By J. S. KELLETT SMITH, F.R.C.S. Eng. .... 188

Holopæc or Empire? By Herbert BRANSTON GRAY, D.D. Oxon., and Samuel TURNER..... 188

British Journal of Inebriety.... 188

### LEADING ARTICLES.

INFECTIVE AND TOXIC FORMS OF JAUNDICE .. 189

GU-SHOT. INJURIES OF THE SPINAL CORD ..... 190

### ANNOTATIONS.

Less Beer and More Bread ..... 191

The Prescribing of Cocaine ..... 192

An American Opinion on Birth Control .. 192

The Serum Treatment of Spirochætosis ... 192

Climate and Health ..... 193

Histological Changes in the Spinal Cord following Bullet Wounds ..... 193

Royal British College of Nursing 194

Juvenile Delinquency ..... 194

### SPECIAL ARTICLES.

The Control of Venereal Diseases ..... 195

The Services ..... 197

### PUBLIC HEALTH.

Reports of School Medical Officers ..... 196

URBAN VITAL STATISTICS: English and Welsh Towns.... 197

Scotch Towns ..... 197

Irish Towns ..... 197

### CORRESPONDENCE.

The Phenomena of Anaphylaxis (Dr. W. W. U. Topley, Major A. S. Leyton, R. A. M. J. (T.F.)) 198

Definition of Acute Alcoholism (Dr. W. J. Sullivan) ..... 199

The State Octopus and the Medical Profession (Mr. Charles A. Parker) ..... 199

Spirochetal Jaundice (So-called "W.H.'s Disease") (Dr. Arthur F. Hurst) ..... 200

Passive Hypersensitivity in Wound Treatment (Captain R. L. Gammon, I.M.S. (ret'd.)) .. 200

The Prevention of Venereal Diseases (Dr. Robert R. Beestul) ..... 204

The Conservative Treatment of Burns and Scalds (Mr. Christopher Kempster) ..... 204

### THE WAR.

The Casualty List ..... 200

Deaths among the Sons of Medical Men ..... 200

The Honours List ..... 200

Mentioned for Distinguished Services ..... 201

Central Medical War Committee 201

The Transference of the Training Establishment of the Royal Army Medical Corps ..... 201

Treatment of Burns and Scalds in the Navy ..... 201

The Red Cross ..... 202

Ambulances for the Balkans ..... 202

The Baths of Sidmouth (Devon) 202

The Wounded Allies Relief Committee ..... 202

### MEDICAL NEWS.

Brighton Hospital Sunday..... 188

Hastings and Mentally Defective Children ..... 188

Dublin University Election ..... 194

Hart House V.A.D. Hospital, Burnham, Somerset ..... 197

Hospital Sunday at Plymouth. The College of Nursing, Limited ..... 200

Royal College of Surgeons of England. Pass-list ..... 202

Royal College of Physicians of London: Meeting of Comitia 202

Huntington Society ..... 202

Scottish Poor-law Medical Officers' Association ..... 203

### INDEX.

VOL. II., 1916 ..... III.-xxiv.  
TITLE-PAGE.  
(See Notice on p. 194)

Appointments—Vacancies ..... 203

Births, Marriages, and Deaths. 203

Notes, Short Comments, and Answers to Correspondents ..... 204

Editorial Diary ..... 205

Editorial Notices ..... 206

Manager's Notices ..... 205

Meteorological Readings ..... 205

Acknowledgment of Communications received ..... 206

FOR INDEX TO ADVERTISEMENTS SEE PAGES 2 & 4.

**JOHN BALE, SONS & DANIELSSON, LTD.,**  
PRINTERS, PUBLISHERS, & PROCESS BLOCK MAKERS.

**TROPICAL AND SUB-TROPICAL CLIMATES AND THE PRINCIPLES**  
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271 + viii. pp. Cloth. 7s. 6d. net; postage 4d.

88, 85, 87, 89 & 91, GREAT TITFIELD ST., OXFORD ST., LONDON, W..

## INDEX

## MEDICAL AND OTHER BOOKS AND PUBLICATIONS

PAGE	PAGE	PAGE
BILLIEFF, TINDALL & COX.—	BUK SONS & DANIELSSON.—	LEWIS & CO.—(Continued).
Aids to Obstetrics ..... 5	Baby—A mobile or Tropical	Oliver, Sir Thomas—Lead-Poisoning ..... 5
Beddoes' <i>Practitioner's Formulary</i> and Index of Pharmacy ..... 3	Dysentery ..... 1	Parke & Kenwood—Hygiene and Public Health ..... 5
Blake-Knox's Military Sanitation and Hygiene ..... 3	Calmette—Venomous Animals, and Antivenomous Serum Therapies ..... 1	Swanson's Handbook of Diseases of the Eye and their Treatment ..... 5
Child-Surgical Nursing and Technique ..... 3	Daniels—Studies in Laboratory Work ..... 1	
Fitz-Williams' Practical Manual of Bandaging ..... 3	Daniels—Tropical Medicine and Hygiene ..... 1	MEDICAL PUBLISHING CO.—
French's Medical Laboratory Methods and Tests ..... 3	Garrison—Tropical and Sub-Tropical Climates ..... 1	Lane, Sir A.—Operative Treatment of Fractures ..... Cover 1
Gadd's Synopsis of the B.P. 1914 ..... 3	Walker—Surgical Diseases, &c., of Genito-Urinary Organs. Cover 1	NISBET & CO.—
Gardner's Surgical Anaesthesia ..... 3	Waring—Surgical Diseases of the Gall Bladder, Bile Ducts, and Liver ..... 6	Romer and Creasy—Bonesetting and the Treatment of Painful Joints ..... Cover 1
Gardner—Manual of Surgical Anesthesia ..... Cover 1	Waring—Manual of Operative Surgery ..... 6	SAUNDERS COMPANY.—
Hayes—Intensive Treatment of Syphilis and Locomotor Ataxia by Aschen Method ..... Cover 1	CHURCHILL, J. A.—	Bandler—The Expectant Mother ..... 7
Ince's Latin Grammar of Pharmacy ..... 3	Davies' Minor Surgery ..... Cover	Brady—Personal Health ..... 7
Lake's Diseases of the Ear ..... 3	Hare—Alcoholism ..... Cover	Moynihan, Sir B.—Abdominal Operations ..... 7
Lamb's Throat, Nose and Ear ..... 3	Hull—Surgery in War ..... Cover	Moynihan's Abdominal Operations ..... Cover 1
Langdon Brown's Physiological Principles in Everyday Treatment ..... 3	Lelean—Sanitation in War ..... Cover	Stiles—Human Physiology ..... 7
Lockhart-Mummery's After-Treatment of Operations ..... 3	Rowlands & Turner's Operations Cover	
Minetti's Diagnosis of Bacteria and B'nd Parasites ..... 3	Squire's Companion to the British Pharmacopoeia ..... Cover	WRIGHT & SONS (Barber).—
Moor & Partridge—Aids to Bacteriology ..... 3	Taylor's Operative Surgery Cover	Morison—Surgical Contributions from 1881-1916 ..... 6
Morison's Disorders of the Heart ..... 3	Warren's Text-Book of Surgery Cover	
Mutter's Analytical Chemistry ..... 3	CONSTABLE & CO.—	MEDICAL LIBRARIES, &c.—
Tait & Krause—Aids to Physiology ..... 3	Battle—The Acute Abdomen ..... 6	Baker—Books ..... 4
Walsh's Diseases of the Skin ..... 3	Bell & Corner—Surgery of Diseases of the Appendix Verminiflora and their Complications ..... 6	Behnke—Stammering, Lispings, & Cleft Palate Speech ..... 4
Williams' Minor Maladies and their Treatment ..... 3	Burn-Vita—Statistics Explained. Ellis—Essays in War-Time	Ketley—Stammering ..... 4
Younou's Insanity in Everyday Practice ..... 3	Kellogg & Doane—Economic Zoology and Entomology	Matthews—Wood—Application of Trusses to Hernia ..... 6
	Moran, &c.—The Mechanism of Mendelian Heredity	Scholl Mfg. Co.—Scientific Correction for Alliments of the Feet ..... 9
	Sheman—Post Mortem and Morbid Anatomy ..... 6	
	White—The Pathology of Growth ..... 6	

## OFFICIAL AND GENERAL ANNOUNCEMENTS.

EXISTANCES, MEDICAL ..... 55	ASYLUMS—(Continued).	NURSES' ASSOC. (Continued).
ASYLUMS, HOMES, &c.—	Northwoods House, Winterbourne 50	Hospital for Sick Children ..... 47
Ashwood House, Kingswinford ..... 52	Otto House, West Kensington ..... 53	London Nurses' Association ..... 48
Barnwood House Hospital ..... 49	Peacham House ..... 51	London Temperance Nurses Co-operation ..... 48
Bishopstone House, Bedford ..... 52	Pendyke Hall Sanatorium, North Wales ..... 51	Male Nurses' Temperance Co-operation ..... 48
Brunton House, Lancaster ..... 53	Plympton House, Plympton ..... 49	Mental Nurses' Association ..... 47
Camberwell House, Peckham-road ..... 50	Portsmouth Corporation Mental Hospital ..... 53	Mental Nurses' Co-operation ..... 47
Chadle Royal ..... 49	Royal Earlswood Institution for Mental Defectives ..... 50	Nurses' Co-operation ..... 47
Clarendon Lodge, Clapham Park ..... 53	St. Andrew's Hospital, Northampton ..... 49	Registered Nurses' Society ..... 48
Coithouse House School, Alderley Edge ..... 55	St. George's Retreat, Burgess Hill ..... 53	St. John's House ..... 47
Coppice, Tha, Nottingham ..... 49	Springfield House Private Asylum, Bedford ..... 52	St. Luke's Hospital ..... 47
Dalrymple House, Rickmansworth ..... 51	Stretton House, Church Stretton ..... 49	Temperance Association of Male Nurses, Ltd. ..... 48
Deaf-Lewis Colony, Alderley Edge ..... 53	The Grange, near Rotherham ..... 49	The Retreat, York ..... 48
Duff House, Banff ..... 52	Vale of Cwyd Sanatorium ..... 51	
General Manager, Craven-street ..... 43	Wainford Asylum, Oxford ..... 53	OFFICIAL NOTICES.—
Ghyllswood Sanatorium ..... 51	Wye House, Buxton ..... 49	City of London Lying-in Hospital ..... 46
Grove House, Church Stretton ..... 49		College of Preceptors ..... 46
Grove, The, Catton, Norwich ..... 49		London Hospital ..... 46
Haslemere Nursing Home ..... 53		London School of Tropical Medicine ..... 43
Haydock Lodge, Newton-le-Willows ..... 50		Metropolitan Hospital Sunday Fund ..... 46
Higham Hall, Norfolk ..... 49		North-East London Post-Graduate College ..... 46
Homes for Inebriate Women ..... 51		Queen Charlotte's Lying-in Hospital ..... 46
Hove, Sussex ..... 55		Royal College of Surgeons ..... 46
Littleton Hall, Brentwood ..... 47		University of Durham ..... 46
London Fever Hospital ..... 49		
Malling Place, Kent ..... 49		PARTNERSHIPS & PRACTICES, 53
Melbourne House, Leicester ..... 51		
Mendip Hills Sanatorium ..... 52		TUTORS & LECTUREES.—
Meat House, Tamworth ..... 49		Medical Correspondence College, 47
Newtowns Retreat, Lanarkshire ..... 51		Weymouth ..... 46
Newton-Soughton Hall, Polton, Mid-Lancashire ..... 50		
Neudrich-on-Dee, Banchory ..... 52		
Northumberland House, Finsbury Park ..... 50		

## TRADE AND MISCELLANEOUS ADVERTISEMENTS

PHARMACEUTICS.—	CHEMISTS—(Continued).	CHEMISTS—(Continued).
St. John Ambulance—Invalid Carriages ..... 8	Antiphlogistin ..... 30	Christy & Co.—
Troon Town Council—Ambulance Waggon ..... 58	Battley & Watt—	Glyco-Thymoline ..... 18
BOTTLE MERCHANTS.—	Liquor Opif Sedatives ..... 35	Glyco-Herol ..... 43
Isaac ..... 8	" Cinchona Cord. ..... 35	Crookes' Laboratories—
CARTRIAGES, MOTORS, &c.—	" Clinch. Pallid. ..... 35	Colloids ..... 12
Armstrong—Liveries ..... 56	Seccalis Cornuti ..... 35	Erasmic Co.—Kinsol Medicated Toilet Soap ..... 58
Seabrook Bros.—R.M.C. Coups ..... 56	Boots Pure Drug Co.—	Etablissements Poulen Freres—
CHEMISTS & DRUGGISTS.—	Aspirin Compressed Tablets ..... 15	Stovaine ..... 11
Allen & Hanbury—Allenbury Throat Pastilles ..... 23	Phenacetin " and Caffein" Compressed Tablets ..... 15	Fassett & Johnson—
Byno Diphosphophites ..... 23	Sodium Salicylate Compressed Tablets ..... 15	Emol-Kleet ..... 34
Christison ..... 24	Hexamine Compressed Tablets ..... 15	Fellows Medical Manf. Co.—
" Capsules ..... 24	British Drug Houses Ltd.—	Fellows' Syrup ..... Cover III
" Confection ..... 24	Intramine ..... 20	Gale & Co.—Elixir Crescolla c. Herola Co. &c. ..... 42
" Emulsion ..... 24	British Organotherapy Co.—	Hepallis—Urodonal ..... 22
Byno Chromol ..... 24	Reliable Organotherapy Preparations ..... 11	Hewlett & Son—
Anglo-French Drug Co.—Galy ..... 32	British Oxygen Co.—	Mist. Pepino Co. Bismutho. ..... 28
Sterilizable Outfit ..... 32	Oxygen ..... Cover II	Mist. Hepatica Conc. ..... 28
Hectine ..... 32	British Purchasers—	Liquor Santal Flav. o. Buchu et Cubeba ..... 28
Hectyra ..... 32	Cystopur ..... 16	Mist. Damiana Co. ..... 28
Antikamnia Chemical Co.—Antikamnia Tablets ..... 34	Burroughs Wellcome & Co.—	Howards' Soda Bicarb. ..... 42
	Paroleline, Ixamel ..... 28	Lambert Pharmacal Co.—
	Hypoloid Brand Products ..... 29	Listerine ..... 36

Continued on page 4.

# THE LANCET.

No. 4876.

LONDON, SATURDAY, FEBRUARY 10, 1917.

Vol. CXCII.

## CONTENTS.

The whole of the literary matter in THE LANCET is copyright.

A SERIES of 500 Emergency Operations for Abdominal Wounds. By C. FEARNS WATERS, F.R.C.S. Eng., Captain, R.A.M.C. (T.); H.D. BOLLINGBROKE, M.D., B.S. Lond., Captain, R.A.M.C. (S.E.); A.R. JORDAN, M.D. Cantab., F.R.C.S. Eng., Captain, R.A.M.C. (T.O.); and A. GRAY BANKS, M.D., F.R.C.S. Edin., Lieutenant, R.A.M.C. (T.). With a Prefatory Note by Sir ANTHONY BOWBLEY, K.C.M.G., K.C.V.O., Temp. Surgeon-General and Advisory Consulting Surgeon to British Armies in France. (Illustrated) 217

A LECTURE on the Treatment of Secondary Hemorrhage, with Special Reference to Gunshot Wounds. Delivered in the University of Bristol in the Autumn session, 1916, by CHARLES A. MORTON, F.R.C.S. Eng., Professor of Surgery in the University; Senior Surgeon to the General Hospital and the Children's Hospital, &c. .... 213

### ORIGINAL ARTICLES.

Type of Tubercle Bacilli in Cervical and Axillary Gland Tuberculosis. By A. STANLEY GRAYFITT, M.D. Vict., D.P.H., late Resident Scientific Investigator, Royal Commission on Tuberculosis. (For the Medical Research Committee) 216

Notes on 73 Cases of Cerebro-spinal Fever. By SHEFFIELD NEAVE, M.R.C.S., M.B.C.P., Temporary Captain, R.A.M.C. 219

On the Treatment of Scabies and Some Other Common Skin Affections in Soldiers. By H. G. ADAMSON, M.D., F.R.C.P., Physician for Diseases of the Skin, St. Bartholomew's Hospital, &c. .... 221

Blinded Sailors and Soldiers: Remarks on the Training at St. Dunstan's. By ARVOLD LAWSON, F.R.C.S. Eng., Ophthalmic Surgeon to St. Dunstan's Hostel, &c. .... 223

The Food of the Nation. By EDMUND I. SPRIGGS, M.D., F.R.C.P., Senior Physician, Duff House, Banff, &c. .... 224

### CLINICAL NOTES:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A Case of Intestinal Obstruction by Thrombosis of Mesenteric Veins: Operation; Recovery. By S. G. GHOSH, M.B.C.S., L.R.C.P. Lond., House Surgeon, Royal Albert Hospital, Devonport .... 214

A Case of Apparent Disappearance of Carcinoma of Cervix. By EDWARD O. B. IBOTSON, M.D. Lond., &c., Temporary Lieutenant, R.A.M.C. .... 224

A Case of Sarcoma of Fourth Ventricle. By H. M. GALT, B.Sc., M.B. Glasg., D.P.H., F.O.S., Pathologist, Royal Sussex County Hospital .... 224

### MEDICAL SOCIETIES.

ROYAL SOCIETY OF MEDICINE: SECTION OF ELECTRO-THERAPEUTICS:—History of the Electro-Therapeutic Department of St. Bartholomew's Hospital ..... 225

WEST LONDON MEDICO-CHIRURGICAL SOCIETY: Clinical Significance of Laboratory Tests for Syphilis. —Exhibition of Specimens. .... 225

LONDON DERMATOLOGICAL SOCIETY: Exhibition of Cases ..... 225

### REVIEWS AND NOTICES OF BOOKS.

Encyclopaedia Medica. Second edition, under the general editorship of J. W. Ballantyne, M.D., C.M. Vol. IV. .... 226

Les Appareils Platrés. By Jacques Calvé and Marcel Galland ..... 226

The Catarrhal and Suppurative Diseases of the Accessory Sinuses of the Nose. By Ross Hall Skillern, M.D. .... 226

### LEADING ARTICLES.

ECONOMY IN FOOD ..... 227

NATIONAL HEALTH IN 1915-1916 228

THE CONTROL OF CEREBRO-SPINAL FEVER ..... 229

### ANNOTATIONS.

Stock Mixtures ..... 231

Simulated Jaundice from Picric Acid ..... 231

The Law and the Doctor ..... 232

Syphills without Chance in Women ..... 232

Economy in Glycerine and Sugar for Medicinal Use ..... 233

Dercum's Disease: Adiposis Dolorosa ..... 233

Richard Liebreich ..... 234

The Royal Society of Medicine and the Naval and Military Medical Services ..... 234

### SPECIAL ARTICLES.

The Control of Venereal Diseases ..... 236

The Services ..... 237

### URBAN VITAL STATISTICS:

English and Welsh Towns ..... 237

Scotch Towns ..... 237

Irish Towns ..... 237

### CORRESPONDENCE.

Spirochætosis: Ictero-hemorrhagic (Dr. Frederick Taylor) 233

The Phenomena of Anaphylaxis (Captain S. Wyard, R.A.M.C.) 234

Pneumatic Tourniquets (Surgeon Major Carlill, R.N.) 239

Leakage of "Neuro Electricity" as a Cause of Tremor (Dr. François Hernan-Johnson) 239

The Glycosuria Associated with Meningitis (Dr. Charles E. Box, Dr. Thomas G. Nicholson) ..... 239

The Abnormal Sizes of Official Publications ..... 240

The Pre War Medical Officer (S.R.) and (T.) ..... 240

The Conservative Treatment of Burns and Scalds (Dr. W. Bezly Thorne) ..... 246

### OBITUARY.

Henry Humphreys, M.A., M.D., Cantab., M.R.C.P. Lond. .... 240

### THE WAR.

The Casualty List ..... 241

Deaths among the Sons of Medical Men ..... 241

The Honours List ..... 241

Mentioned in Despatches ..... 242

The Mobilisation of the Medical Profession ..... 242

The Artist at the Front ..... 242

Auxiliary R.A.M.C. Funds ..... 243

The Director General of the Army Medical Service and the Army Council ..... 243

Hospital Magazines ..... 243

Ulster Volunteer Force Hospital 244

OBITUARY OF THE WAR:

Charles Edward Reekitt, L.M.S.S.A. Lond., Surgeon, R.N.—(With Portrait) ..... 241

Frank Ernest Rock, M.D. Lond., D.P.H., Surgeon, R.N.—(With Portrait) ..... 241

Percy Arnold Lloyd-Jones, B.A., M.B., B.C. Camb., D.S.O., Major, R.A.M.C.—(With Portrait) ..... 241

### MEDICAL NEWS.

Medico-Psychological Association of Great Britain and Ireland ..... 221

Literary Intelligence ..... 221

Bristol Eye Hospital ..... 221

Examining Board in England by the Royal Colleges of Physicians of London and Surgeons of England: Pass-list ..... 244

University of Bristol: Pass-list ..... 244

Royal Medical Benevolent Fund 244

The Association of Infant Welfare: A Deputation to Lord Rhondda ..... 244

Dublin University Parliamentary Election ..... 245

### INDEX.

VOL. II., 1916 ..... III.-xxiv.  
TITLE-PAGE  
(See Notice on p. 236)

Appointments—Vacancies ..... 245

Births, Marriages, and Deaths ..... 245

Notes, Short Comments, and Answers to Correspondents ..... 246

Medical Diary ..... 247

Editorial Notices ..... 247

Manager's Notices ..... 247

Meteorological Readings ..... 247

Books, &c., received ..... 248

Acknowledgment of Communications received ..... 248

FOR INDEX TO ADVERTISEMENTS SEE PAGE 2.

**JOHN BALE, SONS & DANIELSSON, LTD.,**  
PRINTERS, PUBLISHERS, & PROCESS BLOCK MAKERS.

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# THE LANCET.

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LONDON, SATURDAY, FEBRUARY 17, 1917.

Vol. CXCII.

## CONTENTS.

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**THE HUNTERIAN ORATION**  
on The Influence Exercised  
by the Military Experience  
of John Hunter on Himself  
and the Military Surgeon of  
To-day. Delivered before the  
Royal College of Surgeons of  
England on Feb. 14th, 1917,  
by Sir G. H. MAKINS,  
F.R.C.S. Eng., K.C.M.G.,  
C.B., Surgeon General, Army  
Medical Service ..... 249

**AN ADDRESS** on Naval Medi-  
cine in the Great War.  
Delivered at the Medical  
Society of London on  
Feb. 12th, 1917, by H. D.  
ROLLESTON, O.B., M.D.  
Cantab., F.R.C.P. Lond.,  
Temp. Surgeon-General, R.N.;  
Consultant Physician, Royal  
Navy; Senior Physician,  
St. George's Hospital.—  
(Illustrated) ..... 255

### ORIGINAL ARTICLES.

On the Passive Immunity Con-  
ferred by a Proprietary  
Dose of Antitetanic Serum.  
By A. T. MACCONKEY, M.B.,  
B.C. Cantab., D.P.H.; and  
ANNE HUMPHREY ..... 259

A Clinical Agglutinometer:  
An Apparatus for Use at the  
Bedside or in the Laboratory  
for Making Rapid Estimations  
of the Agglutinin Titre  
of the Blood. By R. F.  
GARROW, M.D. Aberd.,  
D.P.H., Captain, Royal Army  
Medical Corps. (Report to  
the Medical Research Com-  
mittee.)—(Illustrated) ..... 262

A Short Note on the Effect  
of Pyrexia on Inoculation  
Agglutinins. By G. SELBY  
WILSON, M.B., B.S. Lond.,  
M.R.C.S., L.R.C.P. Lond.,  
Temporary Lieutenant, Royal  
Army Medical Corps. (From  
the Bacteriological Labora-  
tory, Charing Cross Hos-  
pital). ..... 263

The Unrestricted Diet of a  
Sedentary Worker. By  
A. D. WALLER, M.D. Aberd.,  
F.R.S. ..... 272

### MEDICAL SOCIETIES.

**ROYAL SOCIETY OF MEDICINE:**  
CLINICAL SECTION:—Toxic  
Jaundice due to T.N.T.  
Poisoning. Primary Car-  
cinoma of Liver ..... 265

**MEDICAL SOCIETY OF LONDON:**  
Naval Medicine in the Great  
War ..... 265

**JOURNALS** ..... 266

### LEADING ARTICLES.

**THE MEDICAL DEPARTMENT OF  
THE NAVY IN THE WAR** ..... 267

**TUBERCULOSIS AND THE WAR** ..... 268

### ANNOTATIONS.

The New Year Honours ..... 269

A Rare Form of War Neurosis ..... 269

The Work of the Belgian War  
Refugees Committee ..... 270

Shell Wound of the Pregnant  
Uterus ..... 270

Restrictions on the Use of  
Medicinal Glycerine ..... 271

The Dressing of Burns with  
Paraffin Wax ..... 271

Boric Acid in Cream ..... 271

The Scientific Study of Hydro-  
logy ..... 271

Type-reading by Sound ..... 272

### SPECIAL ARTICLES.

The Control of Venereal  
Diseases: Syphilis in Paris.  
—Two Years' Experience of  
Arsenobenzol in France ..... 274

Notes from India: Quinine  
Production and Investigation  
of Indian Indigenous Drugs.  
—Prison Improvement in  
Burma. —Scottish Women's  
Hospitals. —The Catherine  
Booth Hospital at Nagercoil.  
—Death of Dr. B. K. Coomar ..... 275

The Services: Royal Naval  
Medical Service. —Army  
Medical Service. —Royal  
Army Medical Corps ..... 275

### URBAN VITAL STATISTICS.

English and Welsh Towns ..... 275

Scotch Towns ..... 275

Irish Towns ..... 275

### CORRESPONDENCE.

The Differentiation of Heart  
Murmurs in Soldiers (Pro-  
fessor David Drummond) ..... 276

The Phenomena of Anaphylaxis  
(Dr. W. W. C. Topley) ..... 276

The "Toxic" Effects of  
Methylene Blue (Dr. D. G.  
Marshall) ..... 276

The Association of Atrophy of  
the Testicle and Inguinal  
Hernia (Mr. Joseph H. G.  
Calverley) ..... 277

Pneumatic Tourniquets (Dr.  
C. O. Hawthorne) ..... 277

The First School for Mothers  
(Dr. J. B. Sandilands) ..... 277

Stock Mixtures and Panel Pra-  
ctice ..... 277

Teaspoonful Measures of  
Foods ..... 278

Edible Seaweed (Dr. James R.  
Whitwell) ..... 278

### THE WAR.

The Casualty List ..... 279

Deaths among the Sons of  
Medical Men ..... 279

The Honours List ..... 279

Mentioned in Despatches ..... 279

Star and Garter Home, Rich-  
mond ..... 279

The Central Medical War Com-  
mittee ..... 280

Books for British Prisoners of  
War ..... 280

Army Canteens ..... 280

### OBITUARY OF THE WAR:

Hamilton Mathewson, M.B.,  
B.Ch.B., Captain, Royal  
Army Medical Corps. —  
(With Portrait) ..... 279

### MEDICAL NEWS.

Royal Colleges of Physicians  
of London and Surgeons of  
England: Diplomas con-  
ferred ..... 279

Royal College of Surgeons of  
England: Dental Licences  
conferred ..... 279

University of London: Pass-  
list ..... 279

Centenarian ..... 279

Royal Sanitary Institute ..... 279

Regius Professorship of Physic  
in Dublin University ..... 279

St. Mark's Hospital, City-road,  
B.C. ..... 279

New Out-patient Department  
at the Royal Infirmary,

Wigan ..... 279

### PARLIAMENTARY INTELLI- GENCE.

Notes on Current Topics: The  
Parliamentary Session and  
the War. —Criminal Law  
Amendment Bill. —Army  
Medical Boards ..... 279

House of Commons: Wounded  
Prisoners in Switzerland.—  
British Prisoners in Turkey.  
—"Manipulative" Surgery.  
Tuberculosis Treatment of  
Naval Officers ..... 279

### INDEX.

VOL. II., 1916 ..... iii.-xxiv.

TITLE-PAGE.

(See Notice on p. 269)

Appointments	269
Vacancies	269
Births, Marriages, and Deaths	269
Notes, Short Comments, and Answers to Correspondents	269
Medical Diary	269
Editorial Notices	269
Manager's Notices	269
Meteorological Readings	269
Acknowledgment of Communi- cations received	269

FOR INDEX TO ADVERTISEMENTS SEE PAGES 2 & 6.

**JOHN BALE, SONS & DANIELSSON, LTD.,**  
PRINTERS, PUBLISHERS, & PROCESS BLOCK MAKERS.

**THE ETIOLOGY OF ENDEMIC GOITRE.** By Major R. McCARRISON, M.D.R.U.I., I.M.S. Demy 8vo. 216 + vi. pp. With Coloured Map and 57 Illustrations. 10s. 6d. net; postage 4d.

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## INDEX

## MEDICAL AND OTHER BOOKS AND PUBLICATIONS

PAGE	PAGE	PAGE	PAGE
ARNOLD:- Sibley—Treatment of Diseases of the Skin .....	1	FROWDE AND HODDER & STOUGHTON:- Waring—Surgical Diseases of the Gall Bladder, Bile Ducts, and Liver.....	6
BAILLIÈRE, TINDALL & COX:- Rose & Carre's Surgery .....	1	Waring—Manual of Operative Surgery .....	6
BALE, SONS & DANIELSSON:- McCarrison—Etiology of Endemic Goitre .....	1	HILTON & CO.:— Ghosh's Materia Medica .....	6
Worth—Squint: Its Causes, Pathology and Treatment .....	1	KIMPON:- Both—Notes on Military Orthopedics .....	1
CHURCHILL, J. & A.:— Davies—Minor Surgery .....	1	LEWIS & CO.:— Allen—Vaccine Therapy: Its Theory and Practice .....	3
Hare—Alcoholism: Its Clinical Aspects and Treatment .....	1	Binnie—Manual of Operative Surgery .....	3
Hull—Surgery in War .....	1	Cooper—Sexual Disabilities of Man and their Treatment and Prevention .....	3
Lelean—Sanitation in War .....	1	Elliot—Glaucoma: a Handbook for the General Practitioner .....	1
Rowlands & Turner's Operations .....	1	Enquiry—Clinical Bacteriology and Hematology for Practitioners .....	1
Squire's Companion .....	1	LONGMANS, GREEN & CO.:— Bainbridge & Moniz—Essentials of Physiology .....	4
Taylor's Operative Surgery .....	1	Bavilas—Principles of General Physiology .....	4
Warren's Text-Book of Surgery .....	1	Chayne, W. W. & Burghard—Manual of Surgical Treatment .....	4
DANIEL:- Rabagliati—Initis or Nutrition and Exercises .....	6	Colegate—Dental Surgery and Pathology .....	4
		Hillibuton—Essentials of Chemical Physiology .....	4

## OFFICIAL AND GENERAL ANNOUNCEMENTS

A SISTANCES, MEDICAL .....	52	ASYLUMS.—(Continued). New Saughton Hall, Polton, Midlothian .....	49	HOMES WANTED:- C. B. T., Cornhill .....	51
A YLUM, HOMES, &c.— Ashwood House, Kingwinford .....	46	Nordrach-on-Dee, Banchory .....	50	No. 270, L.O., Strand .....	51
Barnwood House Hospital .....	47	Northumberland House, Finsbury Park .....	48	HOSPITAL, INFIRMARY, SANATORIUM, &c., VACANCIES:-	51-53
Bishopstone House, Bedford .....	47	Northwoods House, Winterbourne .....	48	HOUSE & ESTATE AGENTS:- Bedford & Co., Wigmore-street .....	54
Brunton House, Lancaster .....	50	Otto House, West Kensington .....	48	Elliott, Son & Boyton, Vere-street .....	54
Camberwell House, Peckham-road .....	47	Peckham House .....	48	Ley Clark, Wimpole-street .....	54
Cheadle Royal .....	47	Pendyfryn Hall Sanatorium, Nor-draeth-in-Wales .....	49	Male Nurses Temperance Co-operation .....	45
12, Chelring-ton-road, Hanwell .....	51	Plympton House, Plympton .....	47	Mental Nurses Association .....	45
Clarence Lodge, Clapham Park .....	46	Portsmouth Corporation Mental Hospital .....	50	Mental Nurses Co-operation .....	45
Colthurst House School, Alderley Edge .....	50	Royal Earlswood Institution for Mental Defectives .....	48	Nurses' Association .....	45
Coppice, The, Nottingham .....	47	St. Andrew's Hospital, Northampton .....	48	Nurses' Generation .....	45
Dalrymple House, Eccleman-swoth .....	49	St. George's Retreat, Burgess Hill .....	47	Registered Nurses' Society .....	45
David Lewis Colony, Alderley Edge .....	50	Springfield House Private Asylum, Bedford .....	46	St. John's House .....	45
Duff House, Banff .....	50	Stretton House, Church Stretton .....	47	St. Luke's Hospital .....	44
General Manager, Craven-street .....	51	The Grange, near Rotherham .....	47	Temperance Association of Male Nurses, Ltd. ....	45
Ghyllwoods Sanatorium .....	49	Vale of Clwyd Sanatorium .....	49	The Retreat, York .....	45
Grove House, Church Stretton .....	47	Warneford Asylum, Oxford .....	50	OFFICIAL NOTICES:- City of London—Lying-in Hospital .....	44
Grove, The, Catton, Norwich .....	47	Westholm, Torquay .....	51	London School of Tropical Medicine .....	44
Haslemere Nursing Home .....	51	Wye House, Buxton .....	47	Queen Charlotte's Lying-in Hospital .....	44
Haydock Lodge, Newton-le-Willows .....	48	MASSAGE:- No. 267, L.O., Strand .....	53	University of Durham .....	44
Holgham Hall, Norwich .....	47	MEDICAL ACCOUNTANTS, &c.— Turner .....	54	PARTNERSHIPS & PRACTICES:-	54
Homes for Inebriate Women .....	49	MEDICAL AGENTS:- Fieldhall, Limited .....	55	TUTORS & LECTURERS:- Medical Correspondence College .....	44
Hove, Sussex .....	51	Manchester Clerical, &c., Association .....	55	Weymouth .....	44
Littleton Hall, Brentwood .....	47	Medical Agency .....	55		
London Fever Hospital .....	47	Needes, J. C. ....	55		
Malling Place, Kent .....	47	Peacock & Hadley .....	55		
Melbourne House, Leicester .....	49	Turner .....	53		
Mendip Hills Sanatorium .....	49	MEDICAL SCHOOLS:- (LONDON). London School of Clinical Medicine .....	44		
Meyrick, Brighton .....	51	West London Post-Graduate College .....	44		
Moat House, Tamworth .....	47				
Newmains Retreat, Lanarkshire .....	49	CHEMISTS—(Continued). Howett & Son— Mist, Pepino Co. c. Bisamutho	44		

## TRADE AND MISCELLANEOUS ADVERTISEMENTS

AMBULANCES:- St. John Ambulance—Invalid Carriages .....	54	CHEMISTS—(Continued). British Drug Houses Ltd.— Intralane .....	15
BOTTLE MERCHANTS:- Isaac .....	55	British Oxygen Co.— Oxygen .....	40
CARRIAGES, MOTORS, &c.— Armstrong— Chauffeurs', Coachmen's, Footmen's Liveries .....	54	British Purchasers of the Saatzen Co.— Aubactin .....	18
CHEMISTIE & DRUGGISTS:- Allen & Hanburys— Aldenbury Cod-Liver Oil .....	23	Burroughs Wellcome & Co.— Tabloid Brand Zincine Bis-muthous Iodide .....	26
Battley & Watts— Liquor Opii Sedatives .....	32	Tabloid Brand Thyroid Iland .....	24
" Cinchona Cord. ....	32	Enule Brand Rectal Suppositories .....	27
" Clinch. Pallidæ .....	32	Enule Brand Glycerin .....	27
" Secalis Cornuti .....	32	Wellcome Brand Chloroform .....	Cover iv
Boots Pure Drug Co.— Aspirin Compressed Tab'ets .....	33	Wellcome Brand Benzine Inc. Lactate .....	Cover iv
Phenacetin and Caffein Com pressed Tablets .....	33	Wellcome Brand Benzamine Hydrochloride .....	Cover iv
Sodium Salicylate Com pressed Tablets .....	33	Carnrick (G. W.) Co.— Tr. paragon .....	30
Hexamine Compressed Tablets .....	33	Christy & Co.— Glyco-Thymoline .....	18
		Crookes' Laboratories— Colloids .....	42
		Eustace & Co.—Kinsol Medicated Triglyceride .....	40
		Etabilissements Poulenç Frères— Stosavine .....	13
		Fellowes' Medical Manuf. Co.— Fellowes' Syrup .....	13
		Gale & Co.—Elixir Cresolis c. Heroin Co., &c. ....	42
		Heppeles' T'rodonal .....	14
		LEAVES & OO.—(Continued). Ham-A Handbook of Sanitary Law, for the Use of Candidates for Public Health Qualifications .....	5
		Kenway—Public Health Laboratory Work .....	5
		Lead Diagnostic and Treatment of Inipient Pulmonary Tuberculosis .....	5
		Lewes—The Diseases of Women: A Practical Text-book .....	5
		Phillips—Amobiasis and the Dysenteries .....	5
		Rawlins—Landmarks and Surface Markings of the Human Body .....	5
		Shuttleworth and Potts—Mentally Deficient Children .....	5
		Stitt—Practical Bacteriology, Blood Work, and Animal Parasitology .....	5
		Stoddart—Mind and its Disorders .....	5
		LONGMANS, GREEN & CO.:— Bainbridge & Moniz—Essentials of Physiology .....	4
		Bavilas—Principles of General Physiology .....	4
		Chayne, W. W. & Burghard—Manual of Surgical Treatment .....	4
		Colegate—Dental Surgery and Pathology .....	4
		Hillibuton—Essentials of Chemical Physiology .....	4
		WRIGHT & SONS (Barrett)— Index of Treatment .....	6
		MEDICAL LIBRARIES, &c.— Baker—Books .....	6
		Bohn—Stammering, Lip-ting, & Cleft Palate Speech .....	6
		Ketley—Stammering .....	6
		Matthews—Wood: Application of Trusses to Hernia .....	6
		NURSES' ASSOCIATIONS:- Co-operation of Temperance Male and Female Nurses .....	45
		Female Nurse Association .....	45
		General Nursing Association .....	45
		Hospital for Sick Children .....	45
		London Nurses' Association .....	45
		London Temperance Nurses Co-operation .....	45
		Male Nurses Temperance Co-operation .....	45
		Mental Nurses Association .....	45
		Mental Nurses Co-operation .....	45
		Nurses' Association .....	45
		Nurses' Generation .....	45
		Registered Nurses' Society .....	45
		St. John's House .....	45
		St. Luke's Hospital .....	44
		Temperance Association of Male Nurses, Ltd. ....	45
		The Retreat, York .....	45
		OFFICIAL NOTICES:- City of London—Lying-in Hospital .....	44
		London School of Tropical Medicine .....	44
		Queen Charlotte's Lying-in Hospital .....	44
		University of Durham .....	44
		PARTNERSHIPS & PRACTICES:-	54
		TUTORS & LECTURERS:- Medical Correspondence College .....	44
		Weymouth .....	44
		CHEMISTS—(Continued). Wilcox, Jezean & Co.— Arbñl .....	42
		Willows, Francis, Butler & Thompson— Galenic Preparations .....	28
		DISEINFECTANTS:- Condy's Fluid .....	8
		Jeves' Sanitary Compounds Co.— Joyce's Fluid, &c. ....	44
		FOODS — Allen & Hanburys— Allenburys Foods .....	51
		Banger's Food .....	24
		Blatchley's Diabetic Preparations .....	
		Brand & Co.—Meat Juices .....	40
		Gladbury's Co. ....	30
		Collard & Co.—Diabetic Foods .....	41
		Gurnall & Co. ....	
		Dry Peacock's .....	25
		Fairchild Bros. & Foster— Panopepton .....	22
		Fry's Malted Cocoa .....	Cover ill
		Horlick's Malted Milk Co.— Malted Milk Tablets .....	38
		Manhu Food Co.— Manhu Diabetic Foods .....	41
		Pan Yan Plekie .....	41
		Rowntree's Elect Cocoa .....	55
		Savory & Moore— Peptonised Milk Preparations..	36
		Valentine's Meat-Juice .....	Cover ill
		Vi-Cocoa .....	41
		Wander, Ltd.—Ovaltine .....	12

Continued on page 6.

# THE LANCET.

No. 4378.

LONDON, SATURDAY, FEBRUARY 24, 1917.

Vol. CXII.

## CONTENTS.

The whole of the literary matter in THE LANCET is copyright.

HUNTERIAN LECTURE on Dupuytren's Contraction of the Palmar Fascia: Dupuytren's Life and Works. Delivered at the Royal College of Surgeons of England on Feb. 13th, 1917, by J. HUTCHINSON, F.R.C.S. Eng., Hunterian Professor and Examiner in Surgery to the College; Senior Surgeon to the London Hospital.—(Illustrated)..... 285

AN ADDRESS (Abstract of) on the Hunterian Tradition in Cardiac Research. Being the Eighty-ninth Annual Oration delivered before the Hunterian Society on Feb. 14th. By W. LAMONT BROWN, M.A., M.D.Cantab., F.R.C.P. Lond., Assistant Physician to St. Bartholomew's Hospital and Physician to the Metropolitan Hospital; Captain, E.A.M.C. (T.F.)..... 291

ORIGINAL ARTICLES.  
Specificity in Antiseptics. By KENNETH TAYLOR, M.A., M.D., Director of the Laboratories, Robert Walton Goetel Research Fund, Hôpital Complémentaire V.R. 76, France 234

Intestinal Protozoa in Salonika War Area. By Lieutenant W. ROSE, R.A.M.C., Protozoologist, Salonika War Area. (Report to Medical Research Committee)..... 297

Method of Plaster Splinting for the Treatment of Knee-lesions. By GEORGE DAVIS, M.D., B.S.Durh., M.R.C.S., &c., Captain, R.A.M.C.; Surgical Specialist to the Military Hospital, Eastbourne.—(Illustrated)..... 298

Notes on the Starvation Treatment of a Young Diabetic. By P. C. COLLINGWOOD PENNICK, L.M.S.S.A. Lond. House Physician, Royal Sussex County Hospital, Brighton. Remarks by H. HOBHOUSE, M.D. Oxon., F.R.C.P. Lond., Lieutenant-Colonel, R.A.M.C. (T.); Physician to the Hospital..... 299

### MEDICAL SOCIETIES.

ROYAL SOCIETY OF MEDICINE:	
SECTIONS OF OROLOGY AND NEUROLOGY.—War Injuries and Neuroses of Otological Interest .....	300
SECTION OF PATHOLOGY:—The Central Nervous System in Hypothyroidism.—An Anatomical Abnormality Inherited from the Fifteenth Century.—Congenital Hyperthyroidism .....	301
MEXICO-PSYCHOLOGICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND: Dreams and Their Interpretation .....	301

### JOURNALS AND MAGAZINES.

FOOD PROBLEMS .....	302
WAR INJURIES AND NEUROSES OF THE WAR .....	304

### LEADING ARTICLES.

FOOD PROBLEMS .....	303
WAR INJURIES AND NEUROSES OF THE WAR .....	304
—	
ANNOTATIONS.	
Criminal Law Amendment .....	305
Specificity in Antiseptics .....	306
The Statistics of Infantile Mortality .....	306
Ferns as a Source of Starch .....	308
The Prevalence of Intestinal Protozoa .....	317
Ophthalmic Neonatrum .....	307
The Use of Antimony .....	307
—	

### SPECIAL ARTICLES.

The Control of Venereal Diseases .....	308
Paris .....	309
A Monthly Record of Atmospheric Pollution. — Committee for the Investigation of Atmospheric Pollution: Summary of Reports for the Months ending August 31st, 1916, and Sept. 30th, 1916 .....	313
The Services .....	315
—	

UKRAIN VITAL STATISTICS:	
English and Welsh Towns .....	316
Scotch Towns .....	316
Irish Towns .....	316

### OBITUARY.

Walter Hamilton Hylton Jessop, M.A., M.B.Cantab., F.R.C.S. Eng., President of the Ophthalmological Society of the United Kingdom and Senior Ophthalmic Surgeon to St. Bartholomew's Hospital. (With Portrait) .....	310
Claude Lamont Wheeler, A.B., M.D., Editor of the New York Medical Journal .....	312
Eduard Hagenbach, Professor of Children's Diseases in the University of Basle .....	313
Francis Poole Lansdown, M.R.C.S., L.S.A. ....	313

### CORRESPONDENCE.

Official Medicine and the Thrifty Spirit .....	316
Spirochetal Jaundice (Dr. Arthur F. Hurst) .....	316
The Date of Weaning (Dr. Harold Waller) .....	317
Surgeon Probationers (Lieut.-Col. P. Caldwell Smith, R.A.M.C., T.) .....	317
The Place of Sanatorium Treatment in Tuberculosis (Dr. Edward G. Glover) .....	317
Pneumatic Tourniquets (Major R. H. Jocelyn Swan, R.A.M.C.) .....	318
The Dressing of Burns with Paraffin Wax (Anglo-French Drug Co., Ltd.) .....	318
Edible Seaweed .....	323

### THE WAR.

The Casualty List .....	314
Deaths among the Sons of Medical Men .....	314
The Honours List .....	314
The Central Medical War Committee .....	314
The Disabled Sailor and Soldier .....	315
The Army Authorities and Incurable Soldiers .....	315
Health of the German Army ..	315
OBITUARY OF THE WAR:	

### OBITUARY OF THE WAR:

Russell Elliott Wood, M.D., C.M., F.R.C.S.Edin., Lieutenant-Colonel, Royal Army Medical Corps. (With Portrait) .....

### MEDICAL NEWS.

City of London Truss Society .....	299
The Control of Tuberculosis in Ireland .....	299
Aberdeen Royal Infirmary: Annual Report .....	313
Donations and Bequests .....	318
University of Bristol: Pass-list .....	318
Health Insurance Finance in London .....	318
Royal Medical Benevolent Fund Guild .....	318
Central Midwives Board .....	348
Centenarian .....	319

### PARLIAMENTARY INTELLIGENCE.

Notes on Current Topics: Criminal Law Amendment Bill .....	319
House of Commons: Operations on Soldiers — Medical Men's Cars and the Speed Limit. — Hospital Accommodation in Mesopotamia — Medical Treatment of Soldiers' Widows. — Discharged Soldiers and Tuberculosis Treatment. — Derbyshire Insurance Committee. — Manipulative Surgery .....	320
—	
VOL. II, 1916 .....	III-xxiv.
TITLE-PAGE.	

(See Notice on p. 303)

### INDEX.

Books, &c., received .....	320
Appointments .....	321
Vacancies .....	322
Births, Marriages, and Deaths ..	322
Meteorological Readings .....	322
Notes, Short Comments, and Answers to Correspondents ..	322
Medical Diary .....	323
Editorial Notices .....	323
Manager's Notices .....	324
Acknowledgment of Communications received .....	324

FOR INDEX TO ADVERTISEMENTS SEE PAGE 2.

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## INDEX

## MEDICAL AND OTHER BOOKS AND PUBLICATIONS

PAGE	BAILLIERE, TINDALL & COX.—	PAGE	BAILLIERE—(Continued).	PAGE	DANIEL.—	PAGE	SAUNDERS CO.—(Continued).
	Blair Bell's The Sex Complex ..... 5		Tibbles—Food; ..... 5		Rabagliati—Initia or Nutrition and Exercises ..... 6		Krue—Bacteriological Technique. 3
	Bradford & Lovett's Orthopedic Surgery ..... 5		Diets; or, Food in Health and Disease ..... 5		Lewis & CO.—		Krause—Stereology of Nervous and Mental Diseases ..... 3
	Cobb—The Organs of Internal Secretion ..... 6		Tuckey's Treatment by Hypnotism and Suggestion ..... 5		Emery—Clinical Bacteriology and Hematology for Practitioners ..... 1		Kyle—Diseases of the Nose and Throat ..... 3
	Fowler—Enlargement of the Prostate ..... 1		BAILEY, SONS & DANIELSSON.—		Moullin—Enlargement of Prostate ..... 1		Saunders—Food ..... Cover
	Gardner—Urinary Diseases ..... Cover		Diet Charts ..... 1		Moullin—The Biology of Tumours ..... 1		Schamburg—Diseases of the Skin and the Erruptive Fevers ..... 3
	Gardiner—Manual of Surgical Anesthesia ..... Cover		First Aid, Home Nursing, &c. ..... 1		Moullin ..... Cover		Stengel and Fox—Pathology ..... 3
	Lockhart-Mummery—Diseases of the Colon and their Surgical Treatment ..... Cover		Fletcher—Hints for Hospital Orderlies ..... 1		MAGMILLAN & CO.—		
	Lockhart-Mummery's After-Treatment of Operations ..... 5		JASSEL & CO.—		Tubby—Deformities, including Diseases of the Bones and Joints ..... 1		
	Macewen's Surgical Anatomy ..... 5		Walker—Surgical Diseases, &c., of Genito-Urinary Organs. Cover		MEDICAL PUBLISHING CO.—		
	Morison's The Sensory and Motor Disorders of the Heart ..... 6		CHURCHILL, J. & A.—		Lane, Sir A.—Operative Treatment of Fractures ..... 4		
	Sommerville's Practical Sanitary Science ..... 5		Davies' Minor Surgery ..... Cover		SAUNDERS COMPANY.—		
	Thorne—Nauheim Treatment of Diseases of the Heart and Circulation in England. Cover		Hull—Surgery in War ..... Cover		DaCosta—Modern Surgery ..... 3		
			Marshall—Sanitation in War ..... Cover		De Schweinitz—Diseases of the Eye ..... 3		
			Marshall—Explosives ..... Cover				
			Squire's Companion ..... Cover				
			Thorne, Bezy—Schott Methods of Treatment of Chronic Diseases of the Heart ..... 6				

## **OFFICIAL AND GENERAL ANNOUNCEMENTS**

ASSISTANCES, MEDICAL	49	ASYLUMS	(Continued).
ASYLUMS, HOMES, &c.		Meyrick, Brighton	47
Ashwood House, Kingswinford	43	Most House, Tamworth	44
Barnwood House Hospital	44	Newmains Retreat, Lanarkshire	45
Bishopton House, Bedford	45	Nordrach-on-Dee, Banchory	46
Bruntont House, Lancaster	45	No. 71 Cumberland House, Finsbury Park	43
Cotterwell House, Peckham-road	45	No. 79 Northgate House, Wimborne No. 276, L.O. Strand	45
12, Cherington-road, Hanwell	47	Poekham House	45
Clarendon Lodge, Clapham Park	45	Fondyffran Hall Sanatorium, Nor- drach-in-Wales	45
Cothurst House School, Alderley Edge	45	Plympton House, Plympton	47
Coppice, The, Nottingham	43	Plymouth Corporation Mental Hospital	41
Dalrymple House, Rickmansworth	46	Portsmouth Corporation Mental Hospital	44
Dartmoor Sanatorium	46	St. Andrew's Hos., Northampton	41
David Lewis Colony, Alderley Edge	43	Shaftesbury House, Formby-by-the-Sea	45
Duff House, Banff	46	Springfield House Private Asylum, Bedford	43
General Manager, Craven street.	47	Stretton House, Church Stretton	41
Ghyllwoods Sanatorium	45	The Grange, Rotherham	41
Grove House, Church Stretton	44	Vale of Clwyd Sanatorium	44
Grove, The, Carlton, Norwich	44	Warrington Asylum, Oxford	45
Halemore Nursing Home	47	Westholm, Torquay	47
Haydon Lodge, Newton-le-Willows	45	Wye House, Buxton	44
Heigham Hall, Norwich	45		
Homes for Inebriate Women	45		
Hove, Sussex	47		
Littleton Hall, Brentwood	47		
London Fever Hospital	44		
McCabe, Blenheim-crescent	47		
Malling Place, Kent	44		
Melbourne House, Leicester	45		
Mendip Hills Sanatorium	46		
FINANCIAL, &c.		ASYLUMS	(Continued).
Equitable, Revolutionary Interest Society	47	Meyrick, Brighton	47
		Most House, Tamworth	44
		Newmains Retreat, Lanarkshire	45
		Nordrach-on-Dee, Banchory	46
		No. 71 Cumberland House, Finsbury Park	43
		No. 79 Northgate House, Wimborne No. 276, L.O. Strand	45
		Poekham House	45
		Fondyffran Hall Sanatorium, Nor- drach-in-Wales	45
		Plympton House, Plympton	47
		Plymouth Corporation Mental Hospital	41
		Portsmouth Corporation Mental Hospital	44
		St. Andrew's Hos., Northampton	41
		Shaftesbury House, Formby-by-the-Sea	45
		Springfield House Private Asylum, Bedford	43
		Stretton House, Church Stretton	41
		The Grange, Rotherham	41
		Vale of Clwyd Sanatorium	44
		Warrington Asylum, Oxford	45
		Westholm, Torquay	47
		Wye House, Buxton	44
HEALTH RESORTS, BATHS, &c.			
Caterham Sanitarium	47		
Drottwich Brine Baths	47		
Smedley's, Matlock	47		
HOSPITAL, INFIRMARY, SANA-TORIUM, &c., VACANCIES	47-48	HOSPITAL, INFIRMARY, SANA-TORIUM, &c., VACANCIES	47-48
HOUSE & ESTATE AGENTS		CONSULTING-ROOMS	
		Brett, T., Temple	51
		Brett, Son & Vic., George-street	51
LIFE & FIRE ASSURANCES, &c.			
Prudential	47		
MASSEAGE			
Associated Male Nurses and Massieurs	45		
Cutter	42		
MEDICAL ACCOUNTANTS, &c.			
Turner	50		
MEDICAL AGENTS			
	51		
MEDICAL SCHOOLS			
(LONDON)			
London School of Clinical Med.	41		
St. Mary's Hos. Medical School	41		
West London Post Graduate Coll.	41		
NURSES' ASSOCIATIONS			
Co-operation of Temperance Male and Female Nurses	42		
Female Nurse Association	42		
General Nursing Association	42		
Hospital for Sick Children	42		
International Nurse Association	42		
London Nurses Association	42		
PARTNERSHIPS & PRACTICES	50		
RAILWAY & STEAMSHIP CO.'S.			
Royal Mail Steam Packet Co.	41		
TUTORS & LECTURERS			
Echneles—Stammering	4		
Weymouth	41		

## **TRADE AND MISCELLANEOUS ADVERTISEMENTS**

<b>AMBULANCES</b> —	
St. John Ambulance — Invalid Carriages .....	51
<b>BOTTLE MERCHANTS</b> —	
Imasco .....	6
<b>CARRIAGES, MOTORS, &amp;c.</b> —	
Armstrong—Livery .....	51
Oxford & Sons—Ford Cars .....	51
Seabrook Bros.—	
R.M.C. Coupé .....	51
<b>CHEMISTS &amp; DRUGGISTS</b> —	
Allen & Hanburys—	
Azoule Pituitarin .....	24
" Alopon .....	24
" Emel'ne .....	24
" Quinine Bithydrochloride .....	24
Camphor .....	24
Bynogen .....	25
Albemarles Castor Oil .....	26
Vapo-Crescylene .....	34
Angier Chemical Co.—	
Angier's Emulsion .....	18
Anglo-American Pharmaceutical Company, Ltd.—	
Peptenzyme .....	37
Anglo-French Drug Co.—	
Cuprasol .....	32
Iodeol .....	32
Battley & Watt—	
Liquor Opium Sedatives .....	Cover III
Boots Pure Drug Co.—	
Aspirin Compressed Tablets, &c. ....	52
British Ortho-therapery Co.—	
Lymphoid Compound .....	11
Lymph Serum .....	11
British Oxygen Co.—	
Oxygen .....	Cover II
Browning & Co.—Sempitrol Emulsion with Salol .....	31
Burroughs Wellcome & Co.—	
Tabloid Brand Tonics .....	25
Infundin .....	28
Concentrated Diphtheria Anti-toxin, &c. ....	28
Christy & Co.—Glyco-Heroin .....	34
Clay, Parrot & Co.—	
Glycolacto-choha .....	37
<b>CHEMISTS</b> —(Continued).	
Erasme Co.—Kinsol Medicated Toilet Soap .....	33
Evans Sons Leischer & Webb—	
Capsul. Oil, Santal Flav. ....	15
Organic Therapeutic Products .....	15
Fletcher, Fletcher & Co.—	
Vibrone .....	33
Gale & Co.—Elixir Cresols c. ....	31
Heroin Co., &c. ....	31
Heppells—	
Urodon, Jubol, Globeol, &c. ....	17
Hewlett & Son—	
Mist Hepatica Conc. .... Cover III	
Hogg & Son—	
Protein Nerve Food .....	12
Hudson's Eumenthol Chemical Co.—Cumenthol Tooth Powder .....	39
Humphrey Taylor & Co.—	
Juniperus .....	13
Maltine Manufacturing Co.—	
Seasonable Compounds .....	27
May & Baker—	
Argenobolin and Novarseno-billon .....	13
Mortensa—	
Electrargol .....	30
Enesol .....	31
Cacodylate of Sodium .....	33
Nourry's Iodinated Wine .....	30
Parke, Davis & Co.—	
Pneumonia Phylacogen .....	22
Raines & Co.—Slinger's Nutrient Suppositories .....	12
Smith & Co.—Half Wine .....	34
Krusak & Sons—	
Kusak, K'sena, Sennine, &c. ....	21
Tidman's Sea Salt .....	38
Wilcox, Jozear & Co.—	
Nativelle's Crystallised Digitoline .....	56
B'odine .....	38
Zimmermann & Co.—	
Subitol .....	20
<b>DISINFECTANTS</b> —	
Condy's Fluid .....	40
Baldwin Bros.—	
Kerol .....	39
<b>FOODS</b> —	
Allen & Hanburys—	
Albemarles Foods .....	23
Aylesbury Dairy Co.—	
Humanized Milk .....	12
Benger's Food .....	12
Blatchley's Diabetic Preparations .....	12
Bovilene Co.—Bovilene .....	11
British Milk Products Co.—	
Sanaphos .....	19
Cadbury's Cocoa .....	31
Carnation & Co.—	
Dry Peptonoids .....	27
Fremantle's Distinctive Ready Soups .....	12
Hospital's Hemostat .....	12
Southall Bros. & Barclay—	
Vitafex .....	14
Valentines' Meat-Juice .....	Cover IV
Van Houten's Cocoa .....	37
Williams & Co.—Vitamogen .....	35
<b>FURNITURE</b> , &c.—	
Carter—	
Furniture for Invalids and Hospital Supplies .....	10
<b>HOSPITALS (ISOLATION)</b> —	
Humphreys, Lim'ted—	
Mobile Hospital Buildings .....	8
Sailors' and soldiers' Mobile Panel Huts and Hospital Wards .....	8
<b>MED. &amp; SURG. APPLIANCES</b> —	
Bailey & Son—	
Trusses .....	9
Davis—Lukens Sterile Catgut with Dulox Needle .....	6
Davis & Geck—	
Sutures fit for Surgery .....	7
Down Bros.—Differential Stethoscopes .....	9
Medical Supply Association—	
Bergonié System of Treating Obesity .....	7
Millikin & Lawley—	
Osteology, &c. ....	40
Murton—	
Drop Wrist Appliance .....	10
<b>MED. APPLIANCES</b> —(Continued).	
Robinson & Sons—	
Gamgee Tissue .....	7
Timpson & Co.—	
Causthus Blister Plaster .....	7
Wormul—System of Aluminium Splinting .....	7
<b>MINERAL WATERS</b> , &c.—	
Contrexéville Pavillon .....	Cover II
Perrier .....	38
<b>OPTICIANS</b> —	
Watson & Sons—	
Microscopes .....	6
<b>TAILORS, BOOTMAKERS</b> , &c.—	
Burberrys—	
Weatherproof, Topcoats, Suits, &c. ....	40
Dowie & Marshall—	
Hygienic Bootmakers .....	Cover II
Evans & Co.—	
Service Uniforms .....	40
Harry Hall—	
Service Dress R.A.M.C. and Navy .....	51
<b>TYPEWRITING</b> , &c.—	
Taylor's Typewriter .....	7
<b>VACCINE LYMPH</b> —	
Chaumier's Calf Lymph .....	38
Jenner Institute for Calf Lymph .....	58
Renner's Calf Lymph Establishment .....	38
<b>WINES, BEER, SPIRITS, &amp;c.</b> —	
Brown, Gore & Co.—	
Gautier's Liqueur Brandy .....	38
Humphrey Taylor & Co.—	
" G. B." Diabetes Whisky .....	13
<b>MISCELLANEOUS</b> —	
Gwyer, Ashford—Chaffause .....	50
No. 280, L.O., Strand—	
Exchange .....	49

# THE LANCET.

No. 4879.

LONDON, SATURDAY, MARCH 3, 1917.

Vol. CXXII.

## CONTENTS.

The whole of the literary matter in THE LANCET is copyright.

**HUNTERIAN LECTURES**  
on the Indian Operation  
of Couching for Cataract.  
Delivered before the Royal  
College of Surgeons of  
England on Feb. 19th and 21st,  
1917, by R. H. BILLIOT, M.D.  
Lond., F.R.C.S. Eng., Lieu-  
tenant-Colonel, Indian Medi-  
cal Service.—(Illustrated).—  
(To be concluded) ..... 325

### ORIGINAL ARTICLES.

The Treatment of Septic  
Wounds with Bismuth-Iodo-  
form-Paraffin Paste. By  
LOUISA GARRETT ANDERSON,  
M.D. Lond., Chief Surgeon,  
Military Hospital, Euston-  
street; and HELEN CHAMBERS,  
M.D. Lond., Pathologist,  
Military Hospital, Euston-  
street. With an Account of the  
Bacteriological and Chemical  
Action of Bismuth-  
Iodoform-Paraffin Paste, by  
HELEN CHAMBERS and J. N.  
GOLDEMITH, M.Sc., Ph.D.  
(Reports to the Medical  
Research Committee.) ..... 331

Clinico-Anatomical Investiga-  
tion of a Rapidly Fatal Case of  
General Paralysis due to  
Acquired Syphilis. By T. H.  
KNOWLES STANSFIELD, M.B.,  
C.M. Edin., Medical Super-  
intendent, London County  
Asylum, Bexley; Hon. Fell.,  
Soc. Clinique de Médecine  
Mentale, Paris; Hon. Con-  
sultant for Mental Diseases to  
the Eastern Command; and  
F. W. MOTT, M.D. Lond.,  
F.R.S., Pathologist to the  
London County Council  
Asylums ..... 335

The Prevalence of Spirocheta  
Burgdorferi in Europeans and  
Natives in the Gold Coast.  
By J. W. SCOTT MAGIE,  
D.Sc., M.B. Edin., Pathologist,  
Gold Coast.—(Illustrated) .... 336

### CLINICAL NOTES:

MEDICAL, SURGICAL, OBSTETRICAL,  
AND THERAPEUTICAL.

Case of Acute Dilatation of the  
Stomach following Gastro-  
Jejunostomy. By FRANK  
GODFREY, M.B., C.M. Edin.,  
Consulting Surgeon, Scar-  
borough Hospital. ..... 340

Case of Inflammation in a  
Persistent Patent Meckel's  
Diverticulum Simulating  
Appendicitis. By ROBERT M.  
GLOVER, F.R.C.S. Edin.,  
Acting Surgeon, Royal In-  
firmary, Dumfries ..... 340

### MEDICAL SOCIETIES.

ROYAL SOCIETY OF MEDICINE:  
SECTION OF OPHTHALMOLOGY.—Exhibition of Cases.  
—For Infection of Human  
Conjunctiva from Cats.—  
Retinal Signs of Arterio-  
sclerosis Compared with  
those of Increased Blood  
Pressure ..... 340

### REVIEWS AND NOTICES OF BOOKS.

Former Cliniques des Lésions  
des Nerfs. By Mdm. Athanassio-Benisty ..... 341

Care and Feeding of Infants  
and Children. By Walter  
Reeve Ramsey, M.D. ..... 342

Clinical Bacteriology and  
Hematology for Practitioners.  
By W. d'Este Emery, M.D.,  
B.Sc. Lond. Fifth edition.... 342

### NEW INVENTIONS.

Improved Apparatus for Intra-  
venous Injection (Dr. W. R. K.  
Watson).—(Illustrated) ..... 342

LEADING ARTICLES.

THE MOBILISATION OF THE  
MEDICAL PROFESSION ..... 343

THE RESTITUTION OF THE WAR  
CRIPPLE ..... 344

### ANNOTATIONS.

The Supply of Medical Students 345  
The Ultimate Results of San-  
atorium Treatment ..... 345

The Intravenous Administra-  
tion of Quinine ..... 345

Intestinal Obstruction due to  
Ascarides ..... 346

Prohibition and the Drinking  
of Methylated Spirit in  
Russia ..... 346

The Prognosis of Gunshot  
Wounds of the Abdomen ..... 347

Idiopathic Dislocation of the  
Eye-ball ..... 347

Another Spirochetal Disease.—  
(Illustrated) ..... 347

### SPECIAL ARTICLES.

The Belgian Doctors' and Phar-  
macists' Relief Fund ..... 348

Physical Treatment for Dis-  
abled Soldiers. Statement  
and Recommendations by  
the Committee of Council of  
the Section of Balneology  
and Climatology of the Royal  
Society of Medicine (Dr. Wm.  
Gordon and others) ..... 348

The Services ..... 350

URBAN VITAL STATISTICS:  
Vital Statistics of London  
during January, 1917 ..... 349

Analysis of Sickness and Mor-  
tality Statistics in London  
during January, 1917 ..... 349

English and Welsh Towns ..... 3-0

Scottish Towns ..... 360

Irish Town ..... 350

### CORRESPONDENCE.

The Mortuion Centre (Prof.  
J. N. Langley) ..... 351

Acute Gastric Ulcer (Captain  
Adolphe Irahams, R.A.M.C.) 351

The Report on Cerebro spinal  
Fever (Surgeon Halliday  
Sutherland, R.N.) ..... 351

The Use of Quinine Internally as  
an Antiseptic (Dr. Vincent J.  
Glover) ..... 352

Liquor Restriction and  
Casualties (Dr. D. Ram Thapar) 352

The First School for Mothers  
(Dr. Eric Pritchard) ..... 352

The Differentiation of Heart  
Murmers in Soldiers (Dr. W.  
Bezly Thorne) ..... 353

### THE WAR.

The Casualty List ..... 363

Deaths among the Sons of  
Medical Men ..... 353

Mentioned for War Services ..... 363

The National Service Depart-  
ment and the Organisation of  
the Medical Profession for  
Military and Civilian Pur-  
poses ..... 364

Scottish Medical Service Emer-  
gency Committee ..... 364

The "O" Disinfecting Fluid ..... 364

The Artist at the Front ..... 365

### OBITUARY.

Thomas Seymour Tuke, M.A.,  
M.B., B.Ch.Oxon., Lecturer  
on Mental Diseases at St.  
George's Hospital, London.... 366

Joseph Lawson, M.B. Dub.,  
L.R.C.S. Ire. ..... 366

### MEDICAL NEWS.

Brighton and the Indian  
Warrior ..... 360

A Medical High Sheriff of  
Dublin ..... 360

Harveian Society of London ..... 363

National Council for Combating  
Venereal Disease ..... 363

West London Medico-Chirur-  
gical Society ..... 366

Royal Medical Benevolent  
Fund ..... 366

### PARLIAMENTARY INTELLI- GENCE.

Notes on Current Topics:  
Legislation on Venereal  
Diseases.—Use of Cocaine in  
Dentistry ..... 366

House of Commons ..... 363

Vacancies ..... 367

Births, Marriages, and Deaths ..... 367

Notes, Short Comments, and  
Answers to Correspondents ..... 368

Medical Diary ..... 368

Meteorological Readings ..... 369

Editorial Notices ..... 369

Manager's Notices ..... 369

Books, &c., received ..... 369

Acknowledgment of Commu-  
nications received ..... 369

FOR INDEX TO ADVERTISEMENTS SEE PAGES 2 & 4.

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## INDEX

## MEDICAL AND OTHER BOOKS AND PUBLICATIONS

PAGE		PAGE
<b>BAILLIÈRE, TINDALL &amp; COX.—</b>		
Gardner—Manual of Surgical Anesthesia .....	Cover	
Hayes—Intensive Treatment of Syphilis and Locomotor Ataxia by Aachen Methods ....	Cover	
<b>BALE, SONS &amp; DANIELSON.—</b>		
Maternity and Child Welfare ....	1	
<b>CHURCHILL, J. &amp; A.—</b>		
Cameron—Diet and Disease in Infancy .....	3	
Edelmann—Text-Book of Meat Hygiene .....	3	
Eden—Manual of Midwifery .....	3	
Eden and Lockyer—Gynaecology .....	3	
Ghon—Primary Lung Focus of Tuberculosis in Children .....	3	
Hare—Alcoholism: Its Clinical Aspects and Treatment. Cover	1	
Marshall—Explosives: their History, Manufacture, Pro- perties and Tests .....	1	
Smith—The Cure of Obesity and Obese Heart .....	3	
Squire's Companion .....	Cover	
Stevens—Plant Anatomy .....	1	
Stimson—Fractures and Disloca- tions .....	3	
<b>CHURCHILL (Continued).—</b>		
System of Treatment .....	3	
Transactions of the Ophthalmo- logical Society of the United Kingdom .....	3	
<b>DANLIR.—</b>		
Rabagliati—Initis or Nutrition and Exercises .....	4	
<b>FROWDE AND</b>		
<b>HODDER &amp; STOUGHTON.—</b>		
McCann—Cancer of the Womb: its Symptoms, Diagnosis, Pro- gnosis, and Treatment .....	1	
Waring—Surgical Diseases of the Gall-Bladder, &c. ....	Cover	
<b>GRIFFIN &amp; CO.—</b>		
Brooke—Tropical Medicine, Hygiene, & Parasitology .....	4	
West—Diseases of the Organs of Respiration .....	4	
<b>KIMPTON (Continued).—</b>		
Watson—Gonorrhœa and its Com- plications in the Male and Female .....	7	
<b>LEWIS &amp; CO.—</b>		
Burnham—Haemoptysis & Haemic Infections: a Handbook for Students and Practitioners .....	28	
Martindale and Westcott—The Extra Pharmacopœia .....	29	
Murrell—What to Do in Cases of Poisoning .....	23	
Oliver—Studies in Blood Pressure, Physiological and Clinical .....	28	
Osler, Sir William—Aequanimitas .....	28	
Parker and Kenwood—Hygiene and Public Health .....	23	
Scott—Modern Medicine and Some Modern Remedies .....	23	
Spur—The Road to a Healthy Old Age .....	28	
Stevens—Medical Diagnosis .....	23	
White—Occupational Affections of the Skin .....	28	
<b>MEDICAL PUBLISHING CO.—</b>		
Lane, Sir A.—Operative Treat- ment of Fractures .....	Cover	
<b>NISBET &amp; CO.—</b>		
Romer and Creasy—Bonesetting and the Treatment of Painful Joints .....	Cover	
<b>SAUNDERS COMPANY.—</b>		
Allen—Local Anesthesia .....	5	
Andera—Practice of Medicine ...	5	
Crile & Lower—Anocl-association .....	5	
DaCosta—Modern Surgery .....	5	
De Schweinitz—Diseases of the Eye .....	5	
Important Books from Saunders' List .....	Cover	
Kerley—Practice of Pediatrics .....	1	
Pilcher—Practical Cystoscopy....	5	
<b>WRIGHT &amp; SONS (Baird).—</b>		
An Index of Prognosis and End- Results of Treatment .....	4	
<b>MEDICAL LIBRARIES, &amp;c.—</b>		
Baker—Books .....	4	
Bahnke—Hammering, Lipping, & Cleft-Palate Speech .....	Cover	
Heffer & Sons, Ltd.—Journals wanted .....	6	
Ketley—Hammering .....	Cover	
Matthews—Wood: Application of Trusses to Hernia .....	Cover	
Schell Mfg. Co.—Scientific Correc- tion for Alliments of the Feet .....	43	
The Prescriber—British Spas and Waters .....	Cover	

## **OFFICIAL AND GENERAL ANNOUNCEMENTS**

<b>ASSISTANCES, MEDICAL</b>	..	53	54
<b>ASYLUMS, HOMES, &amp;c.</b> —			
Ashwood House, Kingswinford	..	47	
Barnwood House Hospital	..	47	
Bishopton House, Bedf ord	..	47	
Bruntont House, Lancashire	..	51	
Camerwell House, Fecahan- road	..	56	
Chadl Royall	..	47	
Clarence Lodge, Clapham Park	..	47	
Colthurst House School, Alderley Edge	..	51	
Coppice, The, Nottingham	..	48	
Dalrymple House, R chmans- worth	..	50	
David Lewis Colony, Alderley Edge	..	51	
Duff House, Banff	..	51	
General Manager, Craven-street	..	59	
Ghyllwoods Sanatorium	..	50	
Grove House, Church Stretton	..	48	
Grove, The, Catton, Norwich	..	48	
Haselemer Nursing Home	..	52	
Haydock Lodge, Newton-le- Willows	..	49	
Heigham Hall, Norwich	..	48	
Homes for Inebriate Women	..	50	
Hove, Sussex	..	52	
Littlegate Hall, Brentwood	..	52	
London Fever Hospital	..	48	
Malling Place, Kent	..	45	
Melbourne House, Leicester	..	50	
Mendip Hill Sanatorium	..	50	
Mayrick, Brigh on	..	52	
Moat House, Tamworth	..	48	
Newmains Retreat, Lanarkshire	..	50	
New Gaughton Hall, Polton, Mid- lothian	..	49	
<b>ASYLUMS</b> —(Continued).			
Nordrach-on-Dee, Banchory	..	51	
Northumberland House, Finsbury Park	..	49	
Northwoods House, Winterbourne No. 273, L O. Strand	..	49	
Otto House, West Kensington	..	52	
Peckham House	..	49	
Pendyffryn Hall Sanatorium, Nor- drach-in-Wales	..	50	
Plympton House, Plympton	..	48	
Portsmouth Corporation Mental Hospital	..	51	
Royal Earlswood Institution for Mental Defectives	..	43	
St. Andrew's Hospital, North- ampton	..	48	
St. George's Retreat, Burgess Hill	..	51	
Springfield House Private Asylum, Bedford	..	47	
Stratton House, Church Stretton	..	48	
The Grange, near Rotherham	..	43	
Town of Clwyd Sanatorium	..	50	
Warneford Asylum, Oxford	..	47	
Westholme, Torquay	..	52	
Wy House, Buxton	..	48	
<b>FINANCIAL</b> , &c.—			
Equitable Reversionary Interest Society	..	45	
<b>HEALTH RESORTS, BATHS, &amp;c.</b> —			
Alexandra Therapeutic Institute	..	51	
Caterham Sanitarium	..	51	
Droitwich Brine Baths	..	51	
Smedley's, Matlock	..	51	
<b>HOSPITAL, INFIRMARY, SANA- TORIUM, &amp;c., VACANCIES</b>	..	52	53
<b>HOUSE &amp; ESTATE AGENTS</b> —			
Bedford & Co., Wimborne-street	..	55	
Elliott, Son & Boyton, Vere- street	..	55	
Lev Clark, Wimpole-street	..	55	
Yates & Yates, Hay-wards-square	..	55	
<b>LIFE &amp; FIRE ASSURANCES, &amp;c.</b> —			
General Life Assurance Co.	..	45	
Medical Sickness and Accident Society	..	30	
National Provident Institution	..	45	
Prudential	..	45	
<b>MASSAGE</b> —			
Associated Male Nurses and Massours	..	47	
<b>MEDICAL ACCOUNTANTS, &amp;c.</b> —			
Turner	..	55	
<b>MEDICAL AGENTS</b> —			
Fieldhall, Limited	..	55	
Manchester Clerical, &c., Associa- tion	..	55	
Medical Agency	..	55	
Needies, J. C.	..	55	
Peacock & Hadley	..	55	
Turner	..	55	
<b>MEDICAL SCHOOLS</b> —			
(LONDON.)			
London School of Clinical Medi- cine	..	45	
West London Post - Graduate College	..	45	
<b>NURSES' ASSOCIATIONS</b> —			
Co-operation of Temperance Male and Female Nurses	..	45	
Females' Nurses' Association	..	45	
General Nursing Association	..	45	
Hospital for Sick Children	..	45	
London Nurses' Association	..	45	
London Temperance Nurses' Co- operation	..	45	
Male Nurses Temperance Co- operation	..	45	
Mental Nurses Association	..	45	
Mental Nurses' Co-operation	..	45	
Nurses' Association	..	45	
Nurses' Co-operation	..	45	
Registered Nurses' Society	..	45	
St. John's House	..	45	
St. Luke's Hospital	..	45	
Temperance Association of Male Nurses, Ltd.	..	45	
The Retreat, York	..	45	
<b>OFFICIAL NOTICES</b> —			
City of London Lying-in Hos- pital	..	45	
College of Preceptors	..	45	
London School of Tropical Medi- cine	..	45	
North-East London Post-Graduate College	..	45	
Queen Charlotte's Lying-in Hos- pital	..	45	
Royal Medical Benevolent Fund	..	45	
<b>PARTNERSHIPS &amp; PRACTICES</b> —			
<b>TUTORS &amp; LECTURERS</b> —			
Medical Correspondence College	..	45	
Weymouth	..	45	

## **TRADE AND MISCELLANEOUS ADVERTISEMENTS**

<b>AMBULANCES.—</b>	<b>CHEMISTS.—(Continued).</b>	<b>CHEMISTS.—(Continued).</b>	<b>CHEMISTS.—(Continued).</b>
Daimler Company— Motor Ambulances for hire .....	Boots Pure Drug Co.— Aspirin Compressed Tablets.... 31 Phenacetin ..... 33 " and Caff. in Com- pressed Tablets..... 33 Sodium Salicylate Compressed Tablets..... 33 Hexamine Compressed Tablets. 33	Hewitt & Son— Hann Phthalate .....	Wilcox, Jouxau & Co.— Kola Aster .....
St. John Ambulance — Invalid Carriages .....	" ..... 33 Bristol-Myers Co.— Sal Hepatica .....	Iodermol .....	Kola Aster .....
<b>ANATOMICAL MECHANICS.—</b>	British Drug Houses Ltd.— Intropine .....	Ung. Sanguinis .....	Willows, Francis, Butler & Thompson— Cough Mixtures .....
Grossmith's Artificial Eyes, Legs, &c. .... 9	British Oxygen Co.— Oxygen .....	Mist Tussi Rub. Concent.	
<b>BOTTLE MERCHANTS.—</b>	Burroughs, Wellcome & Co.— Wellcome Brand Adrenalin .....	Thymolimine .....	
Imperial ..... 42	Tabloid Brand Hypoiodetic Products .....	Liquor Nutraula .....	
<b>CARRIAGES, MOTORS, &amp;c.—</b>	Sold Brand Antiseptics .....	Mint Prun. Wine, Solic.	
Armstrong—Liveries .....	Christy & Co.— Glyco-Thymoline .....	Howard & Sons Ltd.— Aspirin .....	
Seabrook Bros.— R.M.C. Coupé .....	Glyco-Heroin .....	Lambert Pharmaceutical Co.— Listerine .....	
<b>CHEMISTS &amp; DRUGGISTS.—</b>	Cook & Co.— Cocfectant Lozenges .....	Maitline Manufacturing Co.— Maitline with Phos. Iron, & Quinia, and Strychnine .....	
Allen & Hanbury— Allenbury Throat Pastilles .....	Crookes' Laboratories— Collodols .....	Maitline with P. osphates .....	
Byno Christol ..... Cover iv	Etablissements Poulen Freres— Stovaine .....	Newberry & Sons— Pulvis Jacobi Ver. .....	
Christol .....	Fellows Medical Manfg. Co.— Fellows Syrup .....	New York Pharmaceutical Co.— Hayden Viburnum Compound .....	
" Capsules .....	Gale & Co.—Elixir Cresolis c. Heroin Co. &c. .... 39	Parkes, Davis & Co.— Polacaine .....	Benger's Food .....
" Confection .....	Genatosen, Ltd.— Sanatogen .....	Hay Fever Reaction Outfit .....	Blatchley's Diabetic Preparations .....
" Emulsion .....	Hepples— Urodonal .....	Price's Patent Candle Co., Ltd.— Price's Night Lights .....	Brand & C.— Essence of Beef .....
Byno Hypophosphites .....	" ..... 33 Antikamnia Chemical Co.— Antikamnia Tablets .....	Price's Glycerin .....	Cadbury's Cocoa .....
Anglo-French Drug Co.— Iodargol .....	Fellows Medical Manfg. Co.— Fellows Syrup .....	Raines & Co.—Slinger's Nutritia Suppositories .....	Callard & Co.— Diabetic Foods .....
Desirous Pocket Case .....	Gale & Co.—Elixir Cresolis c. Heroin Co. &c. .... 39	S. P. Charles Co.— Sulphqua .....	Carndick & Co.— Dry Pepto-Noids .....
Antikamnia Chemical Co.— Antikamnia & Codeine Tablets. 38	Genatosen, Ltd.— Sanatogen .....	Squire & Sons— Glyphocal .....	Freemans Real Turtle Soup .....
Antiphlogistic .....	Hepples— Urodonal .....	" with Formates .....	Fry's Malted Cocoa .....
Mattley & Watts— Liquor Opil Sudativus .....	" Cinchona Cord. .... 38 " Clinch. Pallidus .....	" with Formates and Strychnine .....	Mantu Food Co.— Mantu Diabetic Foods .....
" Secalis Coriaria .....	" ..... 38	Percol .....	Pan Yan Pickle .....
		Whitfield & Sons—Kmetine .....	R. Swinton's Elect Cocoa ..
			Savory & Moore's Food ..
			Southall Bros. & Hardisty— Vitafier .....
			Valentine's Meat-Juice .. Cover
			Vi-Cocoa .....
			Wander, Ltd.— Ovaltine .....

***Continued on page 4.***

# THE LANCET.

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Vol. CXCII.

## CONTENTS.

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### HUNTERIAN LECTURES

on the Indian Operation of Coaguing for Cataract. Delivered before the Royal College of Surgeons of England on Feb. 19th and 21st, 1917, by R. H. ELLIOT, M.D. Lond., F.R.C.S. Eng., Lieutenant-Colonel, Indian Medical Service. — (Illustrated). — (Continued). . . . . 361

### ORIGINAL ARTICLES.

The Agglutination Curve and its Importance in the Diagnosis of Typhoid and Paratyphoid Fevers in Inoculated Persons. By GEORGES DREYER, M.A. Oxon., M.D. Copenhagen, Major, R.A.M.C., &c.; and A. G. INMAN, M.A., B.M. Oxon., Captain, R.A.M.C. (A Report to the Medical Research Committee). — (Illustrated) . . . . . 365

A Simple Ulcer of the Oesophagus Perforating the Descending Portion of the Aortic Arch and Causing Fatal Hematemesis. By J. B. CHRISTOPHERSON, M.A., M.D. Cantab., F.R.C.P. Lond., F.R.C.S. Eng. Director of the Civil Hospitals of Khartoum and Omdurman, Sudan. — (Illustrated) . . . . . 369

Chronic Empyema: the Value of Decortication of the Lung. By W. H. BATTLE, F.R.C.S. Eng., Lieutenant-Colonel, R.A.M.C. (T.), &c. . . . . 371

Repair of Large Bony Defects in the Skull by Means of a Metal Plate. With a Record of Three Cases. By C. NOON, F.R.C.S. Eng., Major, R.A.M.C., &c. . . . . 373

A Case of Acute Osteomyelitis of the Spine. By LESLIE PARFEE GOULD, M.B. Oxon., F.R.C.S. Eng., Temporary Surgeon, Royal Navy . . . . . 374

The Closure of Colotomy Openings Performed for Wounds of the Rectum. By P. LOCKHART MUMMERY, F.R.C.S. Eng., Senior Surgeon to St. Mark's Hospital for Diseases of the Rectum, London, &c. — (Illustrated) . . . . . 376

### CLINICAL NOTES:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A Note on the Use of "Bliss" following the Operation of Bone-grafting. By H. STEWART BRANDER, M.D. Aberd., Captain, R.A.M.C. . . . . 377

A Note on the Suturing of Fractured Bones by Absorbable Ligatures. By KENNETH H. DIBBY, M.B. Lond., F.R.C.S. Eng., Ho Tung Professor of Clinical Surgery and Professor of Anatomy, University of Hong Kong. — (Illustrated) . . . . . 378

Note on the Use of Physiogogen in Puerperal Septis. By J. H. REYNOLDS, M.B., C.M. Edin. . . . . 378

### MEDICAL SOCIETIES.

HARVARD SOCIETY: Diagnosis in Dyspepsia. . . . . 379

### REVIEWS AND NOTICES OF BOOKS.

A Practice of Gynaecology. By Henry Jellett, M.D. F.R.C.P. 379

Trattato del Neoplasm! Maligni. Di Professore D. S. Roncalli. Volume Secondo . . . . . 379

A Text book of Pathology. By W. G. MacCallum . . . . . 380

Sanitation in War. By Major P. S. Lelean, C.B., R.A.M.C. Second edition . . . . . 380

Practical Sanitation By George Reid, M.D. Aberd., D.P.H. Eighteenth edition . . . . . 380

The Annals of Tropical Medicine and Parasitology. Vol. X. 380

North American Review . . . . . 381

### REPORTS AND ANALYTICAL RECORDS

#### FROM THE LANCET LABORATORY.

Vitamogen . . . . . 381

(1) Albulactin; (2) Cystopurin 381

Ambrine . . . . . 382

—

NEW INVENTIONS.

An Amputation Retractor (Dr. Collingwood Fenwick). — (Illustrated) . . . . . 382

### LEADING ARTICLES.

THE MOBILISATION OF THE MEDICAL PROFESSION: THE POSITION OF DENTISTRY . . . . . 383

THE SPHERE AND FUTURE OF MIDWIVES . . . . . 383

### ANNOTATIONS.

Recent Work on Cerebro-spinal Fever . . . . . 385

The Diet of the Brain-worker . . . . . 385

Two Signs of Thyroid Abscess . . . . . 386

The Tuberculosis Problem . . . . . 386

The Summer Time Act . . . . . 386

Insanity and the War . . . . . 386

### SPECIAL ARTICLES.

The Control of Venereal Diseases . . . . . 382

Notes from India . . . . . 387

Medicine and the Law . . . . . 388

The Services . . . . . 388

### URBAN VITAL STATISTICS:

English and Welsh Towns . . . . . 398

Scotch Towns . . . . . 398

Irish Towns . . . . . 398

### CORRESPONDENCE.

Tuberculosis and the War (Dr. H. A. Ellis) . . . . . 389

A Plea for the Earlier Post-Operative Raying of Breast Cancer (Mr. J. J. Grace) . . . . . 389

Spirochetal Jaundice (Prof. Umberto Gabbi) . . . . . 389

Economy in Feeding (Dr. H. Walter Verdon) . . . . . 389

Official Medicine and the Thrifty Spirit . . . . . 390

Ferns as a Source of Starch . . . . . 394

The Price of Fish . . . . . 398

Potatoes . . . . . 398

### OBITUARY.

Professor Déjerine. — (With Portrait) . . . . . 390

Louis Woodcock, M.D., B.S. Lond., M.A. T.O.D. . . . . . 390

Horace Benge obell, M.D. St. And., M.R.C.P.Lond. . . . . 391

Peter Hugh Montgomerie Mackellar, M.A., M.B., C.M. Glasg. . . . . 391

Robert Bruce, M.R.C.S., L.S.A. 391

### THE WAR.

The Casualty List . . . . . 391

Deaths among the Sons of Medical Men . . . . . 392

The Honours List . . . . . 392

Mentioned in Despatches . . . . . 392

The Central Medical War Committee . . . . . 392

The War Cripples: The Ministry of Pensions Scheme . . . . . 393

Hawarden Cattle Hospital . . . . . 393

Wounded Allies Relief Committee . . . . . 393

The Work of the Red Cross . . . . . 393

### OBITUARY OF THE WAR:

James Froude Fleishman, M.D. Sydney, Lieutenant-Colonel, Australian Army Medical Corps. — (With Portrait) . . . . . 392

### MEDICAL NEWS.

National Association for the Prevention of Infant Mortality . . . . . 399

Royal Society of Medicine . . . . . 394

Armenian Red Cross and Refugee Fund . . . . . 394

Medical Sickness Annuity and Life Assurance Friendly Society . . . . . 394

Association for Promoting the Training and Supply of Midwives . . . . . 394

Charity Organisation Society . . . . . 394

Medical Missions in China . . . . . 394

The Mental After-care Association . . . . . 394

Queen Charlotte's Lying-in Hospital . . . . . 394

—

PARLIAMENTARY INTELLIGENCE.

Notes on Current Topics . . . . . 395

House of Commons . . . . . 396

Appointments — Vacancies . . . . . 397

Births, Marriages, and Deaths . . . . . 397

Books, &c., received . . . . . 397

Notes, short Comments, and Answers to Correspondents . . . . . 398

Verbal Diary . . . . . 399

Editorial Notices . . . . . 399

Manager's Notices . . . . . 399

Geographical Readings . . . . . 400

Acknowledgment of Communications received . . . . . 400

FOR INDEX TO ADVERTISEMENTS SEE PAGES 2 & 4.

**JOHN BAILE, SONS & DANIELSSON, LTD.,**  
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## INDEX

## MEDICAL AND OTHER BOOKS AND PUBLICATIONS

PAGE	PAGE	PAGE	PAGE
<b>ARNOLD:</b>	<b>BALE, SONS &amp; CO.</b> —(Continued).	<b>LEWIS &amp; CO.</b> —(Continued).	<b>MEDICAL PUBLISHING CO.</b> —
Andrews—Midwifery for Nurses.. 7	Thompson's Compendium of the Pharmacopoeias and Formularies .. 1	Goddall and Washbourn—Manual of Infectious Diseases .. 5	Lane, Sir A.—Operative Treatment of Fractures .. 6
Cameron—A Manual of Gynaecology .. 7	Worth—Spontaneous Causes, Pathology and Treatment .. Cover 1	Hellman—Amnesia and Analgesia in Parturition .. 5	NISBET & CO. —
Cowan—Diseases of the Heart .. 7	CHURCHILL, J. & A.—	Kettle—Pathology of Tumours .. Cover 1	Romer and Creasy—Bonesetting and the Treatment of Painful Joints .. Cover 1
Howard—Surgical Nursing and the Principles of Surgery for Nurses .. 7	Bowlands and Turner—Operations of Surgery .. Cover 1	Medical Books .. 4	<b>SAUNDERS COMPANY:</b> —
Hurst—Medical Diseases of the War .. 7	Squire's Companion .. Cover 1	Moullin—Enlargement of Prostate .. Cover 1	Colle—The Kinetic Drive .. 5
Hutchison—Food and the Principles of Dietetics .. 7	Thorne, Besly—Schott Methods of Treatment of Chronic Diseases of the Heart .. 6	Moullin—The Biology of Tumours .. Cover 1	Cullen—Diseases of the Umbilicus .. 5
Leitch—Pocket Book of Treatment .. 7	DANIELI.—	Ostrom—Massage and the Original Swedish Movements .. 5	Eisberg—Surgery of the Spinal Cord .. 5
McIntosh & Fildes—Syphilis: a Systematic Account of Syphils from the Modern Standpoint .. 7	Rabagliati—Initis or Nutrition and Exercises .. 6	Phillips—Amebiasis and the Paroxysm .. 5	Graves—Gynaecology .. 5
Swartz—Diagnosis of Nervous Diseases .. 7	LEWIS & CO.—	Banister—Diseases of the Human Body .. 3	Important New Books from Saunders' List .. Cover 1
Woodward—Medical Nursing .. 7	Bracken—Practical Pain's in the Diagnosis and Treatment of Heart Disease .. 5	Scientific Books .. 3	<b>WRIGHT &amp; SONS (Bawlow):</b> —
<b>BATTY, FE, TINDALL &amp; COX:</b>	Bruce—A System of Radiography .. 3	Shatteworth and Potts—Mentally Deficient Children .. Cover 1	Brock—Ligations and Amputations .. 4
Cobb—The Organs of Internal Secretion .. Cover 1	Buxton—Anesthetics .. 3	Stitt—Practical Bacteriology, Blood Work, and Animal Parasitology .. 3	Groves—Modern Methods of Treating Fractures .. Cover 1
Macewen's Surgical Anatomy .. Cover 1	Cooper—Sexual Disabilities of Man and their Treatment and Prevention .. 3	Swany's Handbook of Diseases of the Eye and their Treatment .. 3	<b>MEDICAL LIBRARIES, &amp;c.:—</b>
Moore & Partridge—Aids to Motorology .. Cover 1	Curgenven—The Child's Diet .. 3	White—Occupational Affections of the Skin .. Cover 1	Baker—Books .. 6
<b>BALE, SONS &amp; DANIELSSON:</b>	De Swietoowski—Mechanotherapy in General Practice .. 3	<b>LONGMANS, GREEN &amp; CO.:</b> —	Bohnke—Stammering, Lipping, & Cleft Palate Speech .. 6
Goodwin—Field Service Notes for R.A.M.C. .. 1	Emery—Clinical Bacteriology and Hematology for Practitioners .. Cover 1	Bavilis—Physiology of Food and Economy in Diet .. Cover 1	Ketley—Stammering .. 6
Hart—How to Cut the Drug Bill .. 1	<b>LIFE &amp; FIRE ASSURANCES, &amp;c.:—</b>	Watson—William—RhinoLOGY: a Text-Book of the Diseases of the Nose and Accessory Sinuses .. Cover 1	Lewis & Co.'s Medical and Scientific Circulating Library .. 4
Local Anesthesia .. 1	Prudential .. 10	<b>MATTHEWS:</b> —	Matthews—Wood: Application of Trusses to Herniae .. 6

## OFFICIAL AND GENERAL ANNOUNCEMENTS

<b>A SISTANCES, MEDICAL</b> .. 48	<b>ASYLUMS</b> —(Continued).	<b>HOUSE &amp; ESTATE AGENTS:</b> —	<b>NURSES' ASSOC.</b> —(Continued).
<b>ASYLUMS, HOMES, &amp;c.:</b> —	Northumbrian House, Finsbury Park .. 45	Head & Co., Baker-street .. 50	London Nurses' Association .. 45
Kashwood House, Kingswinford .. 43	Northwoods House, Winterbourne .. 45	8, Leopold-grove, Blackpool .. 50	London Temperance Nurses' Co-operation .. 45
Barnwood House Hospital .. 44	No. 278, L.O. Strand .. 47	Prudential .. 10	Mental Nurses Association .. 42
Bishopstone House, Bedford .. 44	Peckham House .. 45	Prudential .. 10	Mental Nurses' Co-operation .. 42
Bronston House, Lancaster .. 43	Pendyffryn Hall Sanatorium, Nor-draeth-in-Wales .. 45	<b>LIFE &amp; FIRE ASSURANCES, &amp;c.:—</b>	New Mental Nurses' Co-operation .. 42
Camberwell House, Peckham .. 45	Plympton House, Plympton .. 44	Associated Male Nurses and	Nurses' Association .. 43
Clarendon Lodge, Clapham Park .. 45	Plympton Corporation Mental Hospital .. 44	Masses .. 42	Nurses' Co-operation .. 43
Colthurst House School, Alderley Edge .. 45	St. Andrew's Hospital, North-ampton .. 44	Cutter .. 42	St. John's House .. 42
Coppice, The, Nottingham .. 44	Shaftesbury House, Formby-by-the-Sea .. 45	<b>MASSEAGE:</b> —	St. Luke's Hospital .. 42
Dalrymple House, Rickmans-worth .. 45	Springfield House Private Asylum, Bedford .. 43	Associated Male Nurses and	Temperance Association of Male Nurses, Ltd. .. 42
Dartmoor Sanatorium .. 47	Stretton House, Church Stretton .. 44	Masses .. 42	The Retreat, York .. 43
David Lewis Colony, Alderley Edge .. 45	The Grange, near Rotherham .. 44	<b>MEDICAL ACCOUNTANTS, &amp;c.:</b> —	<b>OFFICIAL NOTICES:</b> —
Duff House, Banff .. 48	Vale of Clwyd Sanatorium .. 45	Turner .. 50	City of London Lying-in Hos-pital .. 41
General Manager, Craven street .. 47	Warneford Asylum, Oxford .. 45	<b>MEDICAL AGENTS:</b> —	Guy's Hospital .. 41
Ghyllwoods Sanatorium .. 45	Westholme, Torquay .. 47	Feldhall, Limited .. 51	Incorporated Society of Trained Masses .. 41
Grove House, Church Stretton .. 41	Wye House, Buxton .. 45	Manchester Clerical, &c., Associa-tion .. 51	London School of Tropical Medi-cine .. 41
Grove, The, Catton, Norwich .. 44	<b>FINANCIAL, &amp;c.:</b> —	Medical Agency .. 51	Queen Charlotte's Lying-in Hos-pital .. 41
Haslemere Nursing Home .. 47	Equitable Reversionary Interest Society .. 41	Needes, J. C. .. 51	York-road General Lying in Hos-pital .. 41
Haydock Lodge, Newton-le-Willows .. 45	<b>HEALTH RESORTS, BATHS, &amp;c.:</b> —	Peacock & Hadley .. 51	<b>PARTNERSHIPS &amp; PRACTICES:</b> —
Heigham Hall, Norwich .. 45	Caterham Sanatorium .. 47	Turner .. 51	RAILWAY & STEAMSHIP CO.'S:—
Home for Inebriate Women .. 45	Droitwich Brine Baths .. 47	<b>MEDICAL SCHOOLS:</b> —	Royal Mail Steam Packet Co. .. 41
Hove, Sussex .. 47	Dremley Matlock .. 47	(London) .. 41	
Littleton Hall, Brentwood .. 47	<b>HOSPITAL, INFIRMARY, SANATORIUM, &amp;c., VACANCIES:</b> —	West London Post-Graduate College .. 41	
London Fever Hospital .. 44	<b>CHEMISTS:</b> —(Continued).	<b>NURSES' ASSOCIATIONS:</b> —	
Malling Place, Kent .. 44	Anglo-French Drug Co.—	Co-operation of Temperance Male and Female Nurses .. 42	
Melbourne House, Leicester .. 45	Ambra .. 50	Female Nurses' Association .. 42	
Mendip Hills Sanatorium .. 46	Kinectol .. 50	General Nursing Association .. 42	
Merry Hemel Hempstead .. 47	Bastley & Watt.—	Hospital for Sick Children .. 42	
Meyrick, Brixton .. 47	Liquor Opti Sedatives .. 12	<b>CHEMISTS:</b> —(Continued).	
Meat House, Tamworth .. 44	Boots Pure Drug Co.—	Gale & Co.—Elixir Cresolica c.	
Newmains Retreat, Lanarkshire .. 48	Aspirin Compressed Tablets .. 18	Heroin Co., &c. .. 35	
Nordrach-on-Doë, Banchory .. 48	Phenacetin .. 18	Heppells—	

## TRADE AND MISCELLANEOUS ADVERTISEMENTS

<b>AMBULANCES:</b> —	<b>CHEMISTS:</b> —(Continued).	<b>CHEMISTS:</b> —(Continued).	<b>DISINFECTANTS:</b> —
St. John Ambulance—Invalid Carriages .. 50	Anglo-French Drug Co.—	Gale & Co.—Elixir Cresolica c.	Condy's Fluid .. 8
<b>BOTTLE MERCHANTS:</b> —	Ambra .. 50	Heroin Co., &c. .. 35	Jeves' Sanitary Compounds Co.—Jeves' Fluid, &c. .. Cover 11
Isaac .. 8	Kinectol .. 50	Heppells—	Quibell Bros.—Kerol .. 37
<b>CARRIAGES, MOTORS, &amp;c.:</b> —	Bastley & Watt.—	London	" Capsules .. 37
Armstrong—Chauffeur's, Coachmen's, Foot-men's Liveries .. 50	Liquor Opti Sedatives .. 12	Hydrogen .. 36	<b>FOODS:</b> —
Oxford & Sons—Ford Cars .. 50	Boots Pure Drug Co.—	Hudson's Eumen-hol Chemical Co.—Eumen-hol Julubes .. 37	Allen & Hanbury's—Athenbury Dier .. 21
Padge, Great Portland street—Swift Coupe .. 50	Aspirin Compressed Tablets .. 18	Jumphrey Taylor & Co.—Junora .. 12	Aylesbury Dairy Co.—Humanized Milk .. 38
<b>CHEMISTS &amp; DRUGGISTS:</b> —	British Organotherapy Co.—	May & Baker—Arsenobillon and Novarseno-billon .. 13	Baker's Flour—Supply Co.—Flour .. 50
Allen & Hanbury—Byrin Amar .. 22	Lymph Compounds .. 13	Moore & Co., Ltd.—Lyman-Pure-Salt .. 39	Bengier's Food .. 14
Christol .. 23	British Oxygen Co.—Oxygen .. 38	Parko, Davis & Co.—Proto-II .. 2	Blatchley's Diabetic Preparations .. 33
Byro Christol .. 21	Brownings & Co.—Semiprolin Emul-sion .. Cover III	Nargol Bonzies .. 29	Carmichael & Co.—Dry Peptoneoids .. 25
Mercurial Cream .. 20	Tartrate Brain Magnesium Sul-phite Compound .. 27	Gono-vaccus Vaccine .. 29	Ghymol Company—Ghymol .. 31
Mercury Nitrate .. 20	Tartrate Brand Sulphur Com-pound .. 27	Gonorrhœa Phylacozin .. 23	Freeman's Distinctive Ready Soups .. 38
" Galciolate .. 20	Teekill Brand So Pum Sulphate Compound .. 27	Sauv. Patinetto and Santal Compound Elixir .. 21	
" Subcalomide .. 20	Kepler Malt Extract .. 28	Urt. Compounds Elixir .. 21	
Salvarsan .. 20	Christy & Co.—Glyco-Heroin .. 39	Methylene Blue Compound Cap-sules .. 29	
Christol Mercuria Inunction .. 20	Fay, Park & Co.—Glycolactophos .. 38	Sauv. Patinetto and Santal Compound Capsules .. 29	
Allenturbs Castor Oil .. 38	Fassett & Johnson—Emol-Kelect .. Cover III		
Vapo-Cresolene .. 38			
Angier Chemical Co.—Angier's Emulstion .. 16			

Continued on page 4.

# THE LANCET.

No. 4881.

LONDON, SATURDAY, MARCH 17, 1917.

Vol. CXXII.

## CONTENTS.

*The whole of the literary matter in THE LANCET is copyright.*

**THE LUMLEIAN LECTURES**  
on Modern Aspects of Heart Disease. Delivered before the Royal College of Physicians of London by G. A. SUTHERLAND, M.D. Edin., F.R.C.P. Lond., Physician to the Hampstead and North-West London Hospital; Physician to the Paddington Green Children's Hospital.—Lecture I. .... 401

### ORIGINAL ARTICLES.

Anthrax: Simulating Cerebro-spinal Fever. By E. J. BERKE, M.A., M.D. Cantab., M.R.C.S., D.P.H., Surgeon-Colonel, H.A.C.; Assistant Medical Officer, Local Government Board. (Report to the Medical Research Committee) ..... 406

The "Latent Period" in Acute Perforations of the Stomach or Duodenum. By DENNIS KENNEDY, F.R.C.S. Ire., Surgeon to St. Vincent's Hospital, Dublin; Surgeon to the Children's Hospital, Dublin, &c. .... 410

Mechanical Supports in Plastic Surgery. By H. D. GILLIES, F.R.C.S. Eng., Captain, Royal Army Medical Corps; Cambridge Hospital, Aldershot; and L. A. B. KING, L.D.S. R.C.S. Eng., Captain, attached Royal Army Medical Corps, Cambridge Hospital, Aldershot.—(Illustrated) .... 412

Plastic Repair in War Injuries to the Jaw and Face. By PERCIVAL P. COLE, M.B. Birm., F.R.C.S. Eng., Honorary Surgeon, King George Hospital, London; Operating Surgeon, Brook War Hospital; Assistant Surgeon, Seamen's Hospital, Greenwich, &c.—(Illustrated) 415

The Antibody Content of the Cerebro-spinal Fluid in Meningococcal Infections, with Special Reference to Vaccine Treatment. By FRANK B. TAYLOR, M.A., M.Sc. Vict., M.D. Lond., F.R.C.S. Eng., D.P.H. Camb., Lecturer on Bacteriology in the University of London, King's College; Pathologist and Bacteriologist to the Queen Alexandra Military Hospital, Millbank. (A Report to the Medical Research Committee) ..... 418

### LEADING ARTICLES.

THE TRAINING OF THE DISABLED SOLDIER ..... 419  
PLASTIC SURGERY OF THE FACE ..... 419

### ANNOTATIONS.

The Influence of Dressings on the Anaerobic Flora of Wounds ..... 421  
The Dietetic Value of Roots and Tubers ..... 421  
The Louse Problem ..... 421  
A Double Radial Artery ..... 422  
The Tennent Chair of Ophthalmology ..... 422  
Factitious Elephantiasis ..... 422  
The Chemistry of War-time Whisky ..... 423  
The Free Supply of Antitoxin in Canada ..... 423

### SPECIAL ARTICLES.

The Control of Venereal Diseases: The Preventive Treatment of Venereal Diseases in Australia.—Resolution of the Royal Society of Medicine.—The Y.M.C.A. and Venereal Diseases—Outfit for the Treatment Centre. .... 424  
Paris: The Aphonias of War and Laryngeal Tuberculosis.—Extraction of Projectiles.—Artificial Limbs and Muscular Re-education ..... 425  
The Services ..... 425

### CORRESPONDENCE.

Bartier Post-operative Raying of Breast Cancer (Dr. Reginald Morton) ..... 426  
The First School for Mothers (Dr. J. E. Sandilands) ..... 427  
The Closure of Colotomy Openings (Mr. Paul Bernard Roth) ..... 427  
The Diet of the Brain-worker (Dr. W. Bezly Thorne) ..... 427  
The Age Limits of Pregnancy (Dr. Fred. J. Smith) ..... 428  
The Intravenous Injection of Quinine (Mr. J. F. Ward) ..... 428

### THE WAR.

The Casualty List ..... 428  
Deaths among the Sons of Medical Men ..... 428  
The Honour List ..... 428  
Doctors and National Organisation ..... 428  
War Disablism ..... 429  
The Emergency Surgical Aid Corps ..... 429  
The Harvard Medical Unit ..... 429  
The Conference Summoned by Mr. Neville Chamberlain ..... 430  
Accommodation for the Wounded at Portsmouth ..... 430  
Vocational Re-education of the Belgian War Cripple ..... 430

### OBITUARY OF THE WAR:

Joseph Ellis Milne, M.A., M.D., C.M. Aberd., D.S.O., Captain, Royal Army Medical Corps.—(With Portrait) ..... 429  
Lieutenant-Colonel J. F. Flashman, A.A.M.C. ..... 429

### MEDICAL NEWS.

Taunton and Somerset Hospital ..... 405  
The late Benjamin Power Beames Burroughs, M.R.C.S., L.S.A. ..... 417  
Centenarians ..... 420  
Literary Intelligence ..... 423  
Cornwall Insurance Committee and Unregistered Dentists ..... 426  
The late Thomas Knox, L.R.C.P. & S. Ire. ..... 428  
Standardised Tuberculins ..... 428  
The late Dr. Patrick W. Maxwell ..... 430  
The Royal College of Surgeons of England: Dental Licences conferred ..... 432  
University of Bristol: Pass-Hat ..... 432  
Royal Microscopical Society ..... 432  
Charity Organisation Society ..... 432  
The late Robert Roxburgh, M.B. Edin., F.R.C.S. Edin., J.P. ..... 432  
Medical Women's Federation ..... 432  
The Professorship of Chemistry in Queen's University, Belfast ..... 433

### PARLIAMENTARY INTELLIGENCE.

Notes on Current Topics: Cocaine in Dentistry.—Criminal Law Amendment Bill ..... 430  
House of Lords: Venereal Disease Bill ..... 431  
House of Commons: Nurses' Registration.—Treatment of Disabled Soldiers in Scotland.—Free Treatment of Venereal Diseases.—Infant Mortality.—Medical Classification of Attested Men ..... 432  
Appointments ..... 433  
Vacancies ..... 433  
Births, Marriages, and Deaths ..... 433  
Notes, Short Comments, and Answers to Correspondents ..... 434  
Medical Diary ..... 435  
Editorial Notices ..... 436  
Manager's Notices ..... 436  
Meteorological Readings ..... 436  
Acknowledgment of Communications received ..... 436

FOR INDEX TO ADVERTISEMENTS SEE PAGE 2.

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CONTENTS, MARCH, 1917.

The Management of the Exceptional Child in Belgium before the War. M. F. BOULENGER, M.D.—The Mental Powers of Children and the Stanford Revision and Extension of the Binet-Simon Intelligence Scale. LEWIS M. TERMAN, Ph.D.—The Value of the Wassermann Reaction in Cases of Mental Deficiency in Children. ALFRED GORDON, M.D.—The Religious Outlook of a Child. Rev. W. REASON, M.A.—After-War Standards of Child Value. ARTHUR BLACK.—School Gardening and Food Economy. HENRY J. ROWLES.—Abstracts.—Child Welfare and State Services.—Child Welfare and the Work of National Organizations and Institutions.—Great Thoughts on Child Welfare.

83, 85, 87, 89 & 91, GREAT TITFIELD ST., OXFORD ST., LONDON, W.

## INDEX

## MEDICAL AND OTHER BOOKS AND PUBLICATIONS

PAGE	CHURCHILL, J. & A.— Squire's Companion ..... Cover 1	PAGE	KIMPTON.— Both—Notes on Military Orthopaedics ..... Cover 1	PAGE	SAUNDERS COMPANY.— Bandler—The Expectant Mother. 5 Brady—Personal Health ..... 5 Moynihan, Sir B.—Abdominal Operations ..... 5 Stiles—Human Physiology ..... 5 Surgical Clinic of Chicago ..... Cover 1
DANIEL.— Rabagliati—Initis or Nutrition and Exercises ..... 4	DANIEL.— Freyer—Enlargement of the Prostate ..... Cover 1	FROWDE AND HODDER & STOUGHTON.— Waring—Surgical Diseases of the Gall Bladder, Bile Ducts, and Liver. Their Pathology, Diagnosis, and Treatment ..... 4	Lewis & CO.— Elliot—Glaucoma: a Handbook for the General Practitioner ..... Cover 1	Lewis & CO.— Powell, Sir R. D., & Hartley—On Diseases of Lungs and Pleura, including Tuberculosis and Mediastinal Growths ..... Cover 1	WRIGHT & SONS (Bristol).— Porter—Diseases of the Throat, Nose, & Ear ..... 4
BAILLIÈRE, TINDALL & COX.— Freyer—Surgical Diseases of the Urinary Organs ..... Cover 1	BAILLIÈRE, TINDALL & COX.— Leskhan-Mummery—Diseases of the Colon and their Surgical Treatment ..... Cover 1	BAILEY, SONS & DANIELSSON.— The Child ..... 1	FROWDE AND HODDER & STOUGHTON.— Waring—Surgical Diseases of the Gall Bladder, Bile Ducts, and Liver. Their Pathology, Diagnosis, and Treatment ..... 4	MEDICAL PUBLISHING CO.— Lane, Sir A.—Operative Treatment of Fractures ..... Cover 1	MEDICAL LIBRARIES, &c.— Baker—Books ..... 4
CAPSELL & CO.— Walker—Surgical Diseases and Injuries of the Genito-Urinary Organs ..... Cover 1	HILTON & CO.— Ghosh's Materia Medica ..... 4	CAPSELL & CO.— Walker—Surgical Diseases and Injuries of the Genito-Urinary Organs ..... Cover 1	HILTON & CO.— Romer and Creasy—Bonesetting and the Treatment of Painful Joints ..... Cover 1	NIBNET & CO.— Hartley—Stammering, Lipping, & Cleft Palate Speech ..... 4	Bonhke—Stammering, Lipping, & Cleft Palate Speech ..... 4
DALE, SONS & DANIELSSON.— The Child ..... 1				NIBNET & CO.— Matthews—Wood: Application of Trusses to Hernia ..... 4	Kotley—Stammering ..... 4

## OFFICIAL AND GENERAL ANNOUNCEMENTS

ASSOCIATIONS, MEDICAL ..... 53	ASYLUMS.—(Continued).	HOSPITAL, INFIRMARY, SANATORIUM, &c., VACANCIES. 51-53	NURSES' ASSOC. (Continued).
ASYLUMS, HOMES, &c. —	Ashwood House, Kingswinford ..... 46	Hospital for Sick Children ..... 45	Hospital for Sick Children ..... 45
	Barnwood House Hospital ..... 47	London Nurses' Association ..... 45	London Temperance Nurses Co-operation ..... 45
	Bishopstone House, Bedford ..... 46	Midwives' Temperance Co-operation ..... 45	Midwives' Temperance Co-operation ..... 45
	Brunton House, Lancaster ..... 46	Men's Nurses' Association ..... 44	Men's Nurses' Association ..... 44
	Camberwell House, Peckham-road ..... 48	Medical Nurses' Co-operation ..... 45	Medical Nurses' Co-operation ..... 45
	Chadwell Royal ..... 47	Nurses' Association ..... 44	Nurses' Co-operation ..... 44
	Clarence Lodge, Clapham Park ..... 46	Prudential ..... 44	Prudential ..... 44
	Colthurst House School, Alderley Edge ..... 46	MASSAGE.—	Temperance Association of Male Nurses, Ltd. ..... 45
	Coppice, The, Nottingham ..... 47	Associated Male Nurses and Massieurs ..... 44	The Retreat, York ..... 46
	Dalrymple House, Rickmansworth ..... 49	MEDICAL ACCOUNTANTS, &c.—	OFFICIAL NOTICES.—
	David Lewis Colony, Alderley Edge ..... 46	Turner ..... 54	City of London Lying-in Hospital ..... 45
	Duff House, Banff ..... 50	MEDICAL AGENTS ..... 55	London School of Tropical Medicine ..... 43
	General Manager, Craven-street ..... 50	MEDICAL SCHOOLS.—	Queen Charlotte's Lying-in Hospital ..... 43
	Ghyllwoods Sanatorium ..... 49	(LONDON.)	Royal College of Physicians of Edinburgh ..... 43
	Grove House, Church Stretton ..... 47	London School of Clinical Medicine ..... 45	Royal College of Physicians of London ..... 44
	Great The Cotton Nook ..... 47	St. Mary's Hos. Medical School ..... 44	Royal College of Surgeons of Edinburgh ..... 43
	Haskins' Nursing Home ..... 50	West London Post-Graduate College ..... 43	Royal Faculty of Physicians and Surgeons of Glasgow ..... 43
	Haydock Lodge, Newton-le-Willows ..... 48	(PROVINCIAL &c.)	University of Edinburgh ..... 43
	Heigham Hall, Norwich ..... 47	University of Edinburgh ..... 43	
	Homes for Inebriate Women ..... 49	NURSES' ASSOCIATIONS.—	PARTNERSHIPS & PRACTICES. 55
	Hove, Sussex ..... 50	Co-operation of Temperance Male and Female Nurses ..... 45	TUTORS & LECTURERS.—
	Littleton Hall, Brentwood ..... 50	Female Nurses Association ..... 45	Medical Correspondence College. 44
	London Fever Hospital ..... 47	General Nursing Association ..... 44	Weymouth ... ..... 44
	Malling Place, Kent ..... 47		
	Melbourne House, Leicester ..... 49		
	Mendip Hills Sanatorium ..... 49		
	Meyrick, Bright' on ..... 51		
	Moat House, Tamworth ..... 47		
	Newmains Retreat, Lanarkshire ..... 46		
	New Saughton Hall, Polton, Midlothian ..... 48		

## TRADE AND MISCELLANEOUS ADVERTISEMENTS

AMBULANCES.—	CHEMISTS.—(Continued).	FOODS.—(Continued).	MED. APPLIANCES.—(Continued).
Daimler Company— Motor Ambulances for hire ..... 9	Gale & Co.—Elixir Cresolis c. Heroin Co., Ltd.— Genosan, Ltd.— Formamint ..... 41	Fairchild Bros. & Foster— Panopton ..... 20	Timpson & Co.— Cantibus Blister Plaster ..... 6
St. John Ambulance—Invalid Carriages ..... 54	Hewitt & Son—Urodonal ..... 16	Fry's Malted Cocoa ..... Cover III	Wright, Ltd.— Household Medical Battery ..... 5
BOTTLE MERCHANTS.—	Hewitt & Son— Mist, Pepsine Co. c. Bismutho 40	Manhu Food Co.— Manhu Diabetic Foods ..... 42	Zearl Repeal Clinical Thermometer ..... 54
Issacs ..... 38	Lambert Pharmaceutical Co.— Listerine ..... 38	Pan Yan Pickle ..... 42	MINERAL WATERS, &c.—
CARRIAGES, MOTORS, &c.—	Maltine Manufacturing Co.— Useful Compounds ..... 25	Rowntree's Elect Cocoa ..... 42	Vichy-Cleistins ..... 56
Armstrong-Liveries ..... 54	Martindale— Amyl Nitrite Capsules, &c. .... 15	Savory & Moore— Peptonised Milk Preparations ..... 37	OPTICIANS:
Brown Brothers— Ducos Spring Gaiters ..... 9	Moore & Co., Ltd.— Lynn-Pure Salt ..... 40	Valentine's Meat-Juices .. Cover III	Bausch & Lomb Optical Co.— Centrifuges ..... 6
CHEMISTS & DRUGGISTS.—	Newberry & Co.— Polivit Jacobi Ver. ..... 40	Vi Coco ..... 38	Watson & Sons— Microscopes ..... 5
Allen & Hanbury— Albany's Cox-Liver Oil ..... 23	Northgate's Pharmaceutical Co.— Hawley's Bismuthum Compound 34	Vitaminogen Ltd.—Vitaminogen ..... 33	SANITARY APPLIANCES, &c.—
Bynol ..... 23	Proust's Lactic Vaccines ..... 24	Wander, Ltd.—Ovaltine ..... 14	Berkefeld Filter ..... 5
Bynol Kinman ..... 23	Raines & Co.—Sling'r's Nutritive Suppositories ..... 40	FURNITURE, &c.—	STOVER, &c.—
Anglo-American Pharmaceutical Company, Ltd.—Peptenzyme ..... 40	Richards & Sons—Lactopeptone ..... 35	Carter—Furniture for Invalids and Hospital Supplies ..... 39	British Commercial Gas Association—Gas Circulating Boiler ..... 8
Anglo-French Drug Co.— Galy, Hectine, Rectagyre, &c. 40	R. P. Charges Co.—Sulphagua ..... 41	HOSPITALS (ISOLATION).—	TAILORS, BOOTMAKERS, &c.—
Antikamnia Chemical Co.— Antikamnia Tablets ..... 32	Squire & Sons— Sterelettes ..... 21	Humphreys, Limited— Mobile Hospital Buildings.... 7	Burberry's—The Burberry ..... 29
Antiphlogistine ..... 29	Wilcox, Joseau & Co.— Riodine ..... 41	Sailor's and Soldiers' Mobile Panel Huts and Hospital Wards ..... 7	Harry Hall—Service Dress ..... 54
Battley & Watts— Battley's Liquors ..... 35	Thompson— Physiologically Tested Drugs .. 34	MED. & SURG. APPLIANCES.—	TOBACCO, CIGARS, &c.—
Boots Pure Drug Co.— Aspirin Compressed Tablets, &c. ..... 58	DIXINFECTANTS.—	Bailey & Son— Burlington Belt ..... 29	Player & Sons— Perfecto Cigarettes ..... 58
Bristish Drugs Co.—Sal Hepatica. 41	Tondy's Fluid ..... 38	Davis & Lukens— Sterile Catgut with Dulox Needle ..... 6	TYPEWRITING, &c.—
British Drug Houses Ltd.— Ipratropium ..... 15	Sutton & Phillips— Autiformil ..... 17	Davis & Gock— Sutures fit for Surgery ..... 58	Yost Typewriter Co.—Yost ..... 5
British Oxygen Co.— Lymphoid Compound, &c. .... 11	FOODS —	Hoechle— Extension Appliances ..... 28	VACCINE LYMPH.—
British Oxygen Co.— Oxygen ..... 11	Allen & Hanbury— Allenburys Foods ..... 31	Hogg & Son—Steam Vaporisers .. 38	Chaumier's Calf Lymph ..... 6
Burroughs Wellcome & Co.— Tabloid Brand Baud P.M. .... 28	Benger's Food ..... Cover IV	Holland— Patent Instep Supports ..... 38	Jenner Institute for Calf Lymph ..... 6
Infusin, Ernutin ..... 27	Blatchley's Diabetic Preparations ..... Cover III	Leslie, Ltd.— Leslie Zopia ..... Cover II	X-RAY, &c., APPARATUS.—
Christy & Co.— Glyco-Thymolite ..... 22	Sanaphos ..... 12	Medicinal Supply Association— Gentilite Therapeutic Incandescent Lamp ..... Cover II	Siemens Brothers & Co.— Foot Switch for X-Ray Outfits. 10
Glyco-Herol ..... 40	Callard & Co.—Diabetic Foods .. 42	Millikan & Lawley— Osteology, &c. .... 38	MISCELLANEOUS:
Crookes' Laboratories.—Collodols. 10	Cornick & Co.— Dry Peptoenoids ..... 55	Murton— Drop Wrist Appliance ..... 37	C. A., Haverstock Hill— Chaufouse ..... 53
Duncan, Flockhart & Co.— Tuberculin, Vaccines ..... 19		Precious Metal Tempering Co.— Tempered Gold Hypodermic Needles ..... 5	No. 40, L.O. Strand— Weighing Machine ..... 54
Etablissements Pouleuc Freres— Stovaline ..... 11		Robinson & Sons— Gamgee Tissue ..... 58	No. 50, L.O. Strand— Secretary-Shorthard Typist ... 53
Fellowes Medical Manfg. Co.— Feltows Syrup ..... 22			

# THE LANCET.

No. 4882.

LONDON, SATURDAY, MARCH 24, 1917.

Vol. CXCIL

## CONTENTS.

*The whole of the literary matter in THE LANCET is copyright.*

**THE LUMELIAN LECTURES**  
on Modern Aspects of Heart Disease. Delivered before the Royal College of Physicians of London by G. A. SUTHERLAND, M.D. Edin., F.R.C.P.Lond., Physician to the Hampstead and North-West London Hospital; Physician to the Paddington Green Children's Hospital.—Lecture II..... 437

**ORIGINAL ARTICLES.**  
"Soldier's Heart." By ADOLPHE ABRAHAMS, M.D. Cantab., M.R.C.P. Lond., Temporary Captain, R.A.M.C.; Officer in Charge of Medical Division, The Connaught Hospital, Aldershot ..... 442  
Important Principles in the Drainage and Treatment of Wounds. By WILLIAM PEARSON, F.R.C.S. Ire., Major, R.A.M.C. (Temp.). With Remarks by P. J. FREYER, C.B., Lieut.-Col., I.M.S. (R.), Consulting Surgeon, Eastern Command ..... 445  
The Influenza Epidemic of Spring, 1916; with Special Reference to Anomalous Throat Signs. By A. GEOFREY SHEBA, B.A., M.B., B.C. Cantab., M.R.C.S., L.R.C.P. Lond., late Lieutenant, R.A.M.C.; Officer in Charge of Pathological Department, Central Military Hospital, Eastbourne; late Clinical Assistant, Medical Out-patient Department, Evelina Hospital for Children, S.E. 450  
The Nervous Factor in Relation to Ophthalmic Conditions. By T. H. HARWOOD, B.A. Oxon., M.B., Ch.B. Edin., Resident Ophthalmic Officer, The King George Hospital, S.E. .... 452

**CLINICAL NOTES:**  
**MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.**  
A Calcified Fibroid Causing Complete Axial Rotation of the Uterus. By G. HUBERT ROBERTS, M.D. Lond., F.R.C.S. Eng..... 454  
"Thyroid Stone." By VERNON PENNELL, M.A., M.B., B.C. Cantab. .... 454  
An Obstructive Case of Faecal Abscess. By EVELYN A. CONSTABLE, M.B., B.S. Durh. 454

### MEDICAL SOCIETIES.

**ROYAL SOCIETY OF MEDICINE:**  
SECTION OF ELECTRO-THERAPUTICS.—The Origin of Electric Currents led off from the Human Body ..... 455  
SECTION OF OBSTETRICS AND GYNAECOLOGY.—Exhibition of Specimens—Total or Sub-total Hysterectomy for Removal of Myomata.—Curious Degeneration of Cervical Tumour ..... 456

### REVIEWS AND NOTICES OF BOOKS.

Syphilis and the Nervous System. By Dr. Max Nonne. Second American edition... 456  
A Historical Sketch of the General Infirmary at Leeds ..... 456  
Pharmacology and Therapeutics. By Horatio C. Wood. Second edition..... 456  
Representative Procedures in Quantitative Chemical Analysis. By F. A. Gooch ..... 457  
The Motor-car. By T. O. A. Lawton and R. J. Harvey Gibson 457  
Organotherapy Products... 457  
The Philippine Journal of Science, Section 3, Tropical Medicine. Vol. XI. .... 457  
The British Journal of Ophthalmology. Vol. I. .... 457  
Endocrinology. Vol. I..... 458

### NEW INVENTIONS.

An Electrode for the Ionic Treatment of Prostatic Enlargement (Mr. Leighton Kesteven).—(Illustrated)..... 459  
**LEADING ARTICLES.**  
"WAR NEPHRITIS." ..... 459  
THE MORAL IMBECILE ..... 459  
ARSENIC IN FOOD PREPARATIONS 460

### ANNOTATIONS.

The Effect of the War on the Supply of Drugs ..... 461  
Report for 1915 of the Registrar-General for Ireland ..... 461  
Therapeutic Value of Direct Sunlight on Scurvy ..... 462  
Dietary Allowances ..... 462  
Horse-sickness of Rhodesia ..... 462  
Medical Similes in Literature. 462  
The Progress of the Royal Medical Benevolent Fund. 463  
The Metropolitan Water-supply 463

### SPECIAL ARTICLES.

The Control of Venereal Diseases ..... 458  
Registrar-General's Annual Summary for 1916 and Return for the Fourth Quarter ..... 464  
The Services ..... 465

### URBAN VITAL STATISTICS:

Vital Statistics of London during the Year 1916 ..... 464  
Analysis of Sickness and Mortality Statistics in London during the Year 1916 ..... 464  
English and Welsh Towns ..... 465  
Scotch Towns ..... 465  
Irish Towns..... 465

### CORRESPONDENCE.

The Closure of Colotomy Openings (Prof. Sinclair White, Mr. Percival P. Cole) 466  
Rations Guide: Food Requirements of Children (Dr. Chalmers Watson) ..... 466  
The Differentiation of Heart Murmurs (Mr. A. Kinsey-Morgan) ..... 467  
Acute Dilatation of the Stomach following Gastro-enterotomy (Mr. P. J. Byrne) ..... 467  
Tuberculosis and the War (Dr. Edward H. Prest) ..... 467  
An Apology (Messrs. Hempson) 467  
Cedar Oil as an Addition to Ambroxine (Prof. Marcus Hartog) ..... 475

### THE WAR.

The Casualty List ..... 468  
Deaths among the Sons of Medical Men ..... 468  
The Honour List ..... 468  
Honiton (Devon) V.A.D. Hospital ..... 468  
Conference Summoned by Mr. Neville Chamberlain ..... 469  
The Mobilisation of the Medical Profession ..... 469  
Educational Facilities for British Prisoners of War ..... 469  
Red Cross Work in the County of London ..... 469  
French Conservative Surgery ..... 469  
War Drawings ..... 469  
Hot Water for the Troops in the Field ..... 469  
Bath Military Hospital ..... 470  
Military Hospital for Cornwall ..... 470  
American Women's Hospital for Officers ..... 470  
A Hospital Extension at Hove ..... 470  
Training of Disabled Soldiers... 470

### OBITUARY.

Frederick W. Halliday, M.R.C.S., L.R.C.P. Lond. .... 468  
Walter Duret Aubin, M.B. C.M. Edin., Lieutenant Baillif and Jurat, Royal Court of Jersey 468  
Isaac Wm. Usher, L.R.C.P. Edin., L.R.C.S. Ire. .... 468  
Henry Colpoys Tweedy, M.D. Dub., F.R.C.P. Ire. .... 471

### MEDICAL NEWS:

St. Austell (Cornwall) Board of Guardians and the Treatment of Adenoids ..... 415  
The Chard Town Council, the Water-supply, and Compensation for Enteric Fever ..... 463  
Bristol Hospital Sunday Fund.. 468  
The Food Problem ..... 468  
Aberdeen Dispensary: Annual Report ..... 465  
The Belfast Maternity Hospital 465  
The Cornwall Naval Hospital ..... 466  
University of Liverpool: Pass-list ..... 470  
Royal College of Surgeons of Edinburgh: Pass-list .. 470  
Royal Medical Benevolent Fund ..... 470  
Red Cross Physical Clinic..... 471  
Royal Aberdeen Hospital for Sick Children ..... 471  
Central Midwives Board ..... 471  
The Health of Munition Workers ..... 471  
Banff Insurance Committee..... 471  
Royal Devon and Exeter Hospital ..... 471  
Donations and Bequests ..... 471  
Royal Sussex County Hospital 471

### PARLIAMENTARY INTELLIGENCE.

Notes on Current Topics: Venereal Disease Bill.—Criminal Law Amendment Bill.—Disabled Soldiers ..... 472  
House of Commons ..... 472  
  
Appointments ..... 473  
Vacancies ..... 473  
Births, Marriages, and Deaths. 473  
Books, &c., received ..... 473  
Notes, Short Comments, and Answers to Correspondents ... 474  
Medical Diary ..... 475  
Editorial Notices ..... 475  
Manager's Notices ..... 476  
Meteorological Readings ..... 476  
Acknowledgment of Communications received ..... 476

FOR INDEX TO ADVERTISEMENTS SEE PAGE 2.

## MATERNITY AND CHILD WELFARE

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### CONTENTS FOR MARCH.

The Midwife and Her Share in the Protection of Motherhood. Lady BARRATT, M.D., M.S.—The Ordinary Diseases of Women which may Affect Pregnancy. AMAND ROUTH, M.D., F.R.C.P. Lond.—The Work of an Infant Welfare Centre: (3) Some Thoughts on its Aims and Duties. P. LOUGHART MUMMERY, F.R.C.S.—The Romance of a District Midwife's Life. A. S. GREGORY.—Leaves from a Midwife's Diary: (1) On Guardians of the Poor. STELLA WRAGGE.—Atlas and Gazetteer of Welfare Centres.—Foot Values. MARGARET MCKILLOP, M.A.—Cartoon.—Food and the Child.—Annotations.—The Common Perils of Childhood: (1) Ophthalmia Neonatorum. N. BISHOP HARWAN, M.A., M.B. Cantab.; F.R.C.S. Eng.—MACQUEEN.—Correspondence.—Abstracts, Notes.—News.—Local Correspondent.—Questions and Answers.

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## INDEX

## MEDICAL AND OTHER BOOKS AND PUBLICATIONS

PAGE	PAGE	PAGE
BAILY, RE, TINDALL & COX:-	SALE, SONS & DANIELSON:-	LEWIS & CO.—(Continued).
Aids to Obstetrics .....	Maternity and Child Welfare .....	Lewis's Pocket Case Book ..... 5
Child's Surgical Nursing and Technique .....	Parsons—Diseases of the Eye .....	Lockwood—Diseases of Stomach .....
Cobin's The Organs of Internal Secretion .....	St. Thomas's Hospital Reports .....	MacLeod—Pathology of the Skin .....
Gadd's Synopsis of the B.P. 1914 .....	Smith—The Cure of Obesity and Obesity Heart .....	Moulin—Eunarchism of Prostate .....
Gardner's Surgical Anesthesia .....	Squire's Companion to the British Pharmacopoeia .....	Moulin—The History of Tumours .....
Gardner—Manual of Surgical Anesthesia .....	Box—Post-Mortem Manual .....	MACKINNON & CO.—
Ince's Latin Grammar of Pharmacy .....	Davies—Minor Surgery .....	Tubby—Deformities .....
Jung's Annals of Physical Physiology .....	Edström—Text-Book of Mental Hygiene .....	MEDICAL PUBLISHING CO.—
Lockhart-Mummery's After-Treatment of Operations .....	Ghon—Primary Lung Focus of Tuberculosis in Children .....	Lane, Sir A.—Operative Treatment of Fractures .....
Mandal—Surgery, &c .....	Hardwicke—Sight-Testing Micro-Easy .....	NISBET & CO.—
May and Worth's Diseases of Eye .....	Hare—Alcoholism .....	Renier and Creasy—Bonesetting, &c .....
McGill's Diagnosis of Bacteria and Blood Parasites .....	Hull—Surgery in War .....	WRIGHT & SONS (Baird).—
Moor & Partridge—Aids to Bacteriology .....	Hurry—Vicious Circles in Disease .....	An Index of Prognosis and End-Results of Treatment .....
Munro Kerr's Operative Midwifery .....	The Vicious Circles of Neuroasthenia .....	Broca—Ligations & Amputations .....
Pickerill's Prevention of Dental Caries .....	Hurry—Vicious Circles in Sociology .....	MEDICAL LIBRARIES, &c.:—
Simon's Infection and Immunity .....	Hurry—Poverty and Its Vicious Circles .....	Baker—Books .....
Tait & Krause—Aids to Physiology .....	Hurry—Ideals and Organisation of a Medical Society .....	Behnke—Stammering, Lispings & Cleft-Palate Speech .....
Thorne—Narheim Treatment of Diseases of the Heart .....	Latham and Torrens—Medical Diagnosis .....	Einhorn—Lectures on Dietetics .....
Tredgold's Mental Deficiency .....	Lelean—Sanitation in War .....	Gould—Practitioner's Medical Dictionary .....
Walsh's Diseases of the Skin .....	.....	Gould A Pocket Medical Dictionary .....
Yonner's Insanity in Everyday Practice .....	.....	Matthews—Wood: Application of Trusses to Hernias .....

## OFFICIAL AND GENERAL ANNOUNCEMENTS

ASSOCIANCES MEDICAL .....	ASYLUMS—(Continued).	LIFE & FIRE ASSURANCES, &c.:—	NURSES' ASSOC. (Continued).
AYLUMLN, HOMES, &c.—	Northwood House, Winterbourne No. 20, L.O., Strand .....	Medical Sickness and Accident Society .....	Nurses' Co-operation .....
Ashwood House, Kingswinford .....	Peckham House .....	Prudential .....	Registered Nurses' Society .....
Barnwood House, Hospital .....	Peckham Hall Sanatorium, Norbury .....	.....	St. John's Hospital .....
Bishopstone House, Bedford .....	Penlynn Hall, Woking .....	.....	St. Luke's Hospital .....
Brunton House, Lancaster .....	Plympton House, Plympton .....	.....	Temperance Association of Male Nurses, Ltd. ....
Camberwell House, Peckham-road .....	Portsmouth Corporation Mental Hospital .....	.....	The Retreat, York .....
Clarendon Lodge, Clapham Park .....	St. Andrew's Hospital, Northampton .....	.....	.....
Colthurst House School, Alderley Edge .....	Shaftesbury House, Formby-by-the-Sea .....	.....	.....
Coppice, The, Nottingham .....	Springfield House Private Asylum, Bedford .....	.....	.....
Dalrymple House, Rickmansworth .....	Stratton House, Church Stratton .....	.....	.....
Dartmoor Sanatorium .....	The Grange, near Rotherham .....	.....	.....
David Lewis Colony, Alderley Edge .....	Vale of Clwyd Sanatorium .....	.....	.....
Duff House, Banff .....	Warneford Asylum, Oxford .....	.....	.....
General Manager, Craven-street .....	Westholme, Torquay .....	.....	.....
Ghyllwoods Sanatorium .....	Wyk House, Buxton .....	.....	.....
Grove House, Church Stratton .....	.....	.....	.....
Grove, The, Cattan, Norwich .....	.....	.....	.....
Haslegrave Nursing Home .....	.....	.....	.....
Hawthorn Lodge, Newcastle .....	.....	.....	.....
Willows .....	.....	.....	.....
Heigham Hall, Norwich .....	Equitable Reversionary Interest Society .....	.....	.....
Homes for Inebriate Women .....	.....	.....	.....
Hove, Sussex .....	HEALTH RESORTS, BATHS, &c.:—	.....	.....
Littleton Hall, Brentwood .....	Caterham Sanitarium .....	.....	.....
London Fever Hospital .....	Droitwich Brine Baths .....	.....	.....
Malling Place, Kent .....	Smedley's, Matlock .....	.....	.....
Melbourne House, Leicester .....	HOSPITAL INFIRMARY, SANATORIUM, &c.; VACANCIES .....	.....	.....
Mendip Hills Sanatorium .....	.....	.....	.....
Moat House, Tamworth .....	HOUSE & ESTATE AGENTS:	.....	.....
Newmains Retreat, Lanarkshire .....	David & Son, Upper-street .....	.....	.....
Nordrach-on-Dee, Bancory .....	No. 50, L.O., Strand .....	.....	.....
Northumberland House, Finsbury Park .....	.....	.....	.....

## TRADE AND MISCELLANEOUS ADVERTISEMENTS

AMBULANCES—	CHEMISTS—(Continued)	FOODS—(Continued).	OPTICIANS
St. John Ambulance—Invalid Carriages .....	Fletcher, Fletcher & Co.—Vibrona 19	Benger's Food .....	Watson & Sons, Ltd.—
Isaac .....	Gale & Co.—Elixir Cresolus c.	Bishop—Bovine .....	Microscopes .....
CARRIAGES, MOTORS, &c.—	Heroin Co., &c. ....	Blatchley's Diabetic Preparation .....	39
Armstrong—Liveries .....	Heppell—	Garnick & Co.—	STATIONERY, &c.:—
Nightingale-lane, Wanstead .....	Friedrich, Jubel, Globeol, &c. ....	Dry Peptoneoids .....	Mable, T. & Co.—
1½-Bedford Coupe .....	Protexine Nerve Food .....	Freeman's Distinctive Ready Soups .....	Swan Fountain Pens .....
Offord & Sons—Ford Cars .....	Hudson's Eumenthol Chemical Co.—Eumenthol Tooth Powder .....	Hommel's Hemostats .....	8
CHEMISTS & DRUGGISTS—	Humphrey Taylor & Co.—Junora Lysol, Ltd.—Marshal's Lysol	Sonthall Bros. & Barclay—Vitala	Venue Pencils .....
Allen & Hanbury .....	Toilet Soap .....	Valentia's Meat-Juice .....	.....
Argyrol, Kavol, Cystazol .....	Maitland Manufacturing Co.—	Cover .....	.....
Bromo Cassiodine .....	Castile Compounds .....	Van Routs's Cocoa .....	.....
Bryogen .....	Martinelli—Amyl Nitrite Capsules, Steriles, &c. ....	.....	.....
Allensbury Castor Oil .....	McKee & Baker—Arsenobillon and Novarsenobillon .....	.....	.....
Vapo-Cresolene .....	Moore & n. Ltd.—	.....	.....
Angier Chemical Co.—	Lynn-Pure-Salt .....	.....	.....
Angier's Emulsion .....	Tristowth Serum .....	.....	.....
Anglo-Frenox Drug Co.—	Rainbow & Co.—Singer's Nutrient Suppositories .....	.....	.....
Enterovaccine .....	Smith & Co.—Hail's Wine .....	.....	.....
Banthine .....	Squire & Son—Terperolin, Coriol and Camphor Comps. ....	.....	.....
Liquor Opil Sedatives .....	Tidman's Sea Salt .....	.....	.....
Becto Pure Drug Co.—Aspirin Compressed Tablets, &c. ....	Kola Astler .....	.....	.....
British Organotherapy o.—	Nativelle's Crystallised Digtaline .....	.....	.....
Lymphoid Compound .....	.....	.....	.....
British Oxygen Co.—	.....	.....	.....
Browning & Co.—Sempronin Emulsion with Salicylic Acid .....	Condy's Fluid .....	.....	.....
Burroughs Wellcome & Co.—	Clay, Fager & Co.—	.....	.....
Thiomersal, &c. ....	Glycolactophen .....	.....	.....
Paracetamol, Laxatives .....	Food.—	.....	.....
Cherry & Co.—Myco-Herols .....	Aylesbury Dairy Co.—	Drop Wrist Appliance .....	.....
Clay, Fager & Co.—	Humanized Milk .....	Robinson & Sons—Injured Tissue	.....
Glycolactophen .....	Baker's Flour Supply Co.—Flour .....	Sorbium & Johnson—	.....
Cook & Co.—	.....	Mead's Rubber Adhesive Plaster .....	.....
Cotectant Soaps .....	.....	Timpson & Co.—	.....
Evans & Sons Lescher & Webb .....	.....	Canthos Blister Plaster .....	.....
Carensol, Ol. Santal. Flav., &c. ....	.....	Wormull—System of Aluminium Splinting .....	.....
2	.....	.....	.....
THE LANCET, ]	.....	.....	.....
THE LANCET GENERAL ADVERTISER	.....	.....	.....
[MARCH 24, 1917]	.....	.....	.....

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Vol. CXXII.

## CONTENTS.

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### THE LUMELIAN LECTURES

On Modern Aspects of Heart Disease. Delivered before the Royal College of Physicians of London by G. A. SUTHERLAND, M.D. Edin., F.R.C.P. Lond., Physician to the Hampstead and North-West London Hospital; Physician to the Paddington Green Children's Hospital.—Lecture III. .... 477

### ORIGINAL ARTICLES.

Further Experiences with Emetine Bisulphite Iodide in Amoebic Dysentery, Amoebic Hepatitis, and General Amoebiasis. By GEORGE O. LOW, M.A. Sc. And., M.D. Edin., Assistant Physician and Lecturer, London School of Tropical Medicine. (Report to the Medical Research Committee.)—(Illustrated). .... 482

A Case of Psychasthenia with Criminal Impulses. By W. NORWOOD EAST, M.D. Lond., M.R.C.S. Eng., L.R.C.P. Lond.; Medical Officer H.M. Prison, Manchester. (With the Permission of the Prison Commissioners.) .... 486

Excision of the Retro-pharyngeal Gland, with a Short Account of Two Cases in which this Operation was Carried Out. By NOAHAN PATTERSON, M.B.B.Ch Edin., F.R.C.S. Eng., Assistant Surgeon, Mr. Nose, and Throat Department, Loudon Hospital; Surgeon, Throat Hospital, Golden-square. —(Illustrated). .... 487

The Principles of the Transfusion of Blood. By A. H. STANSFIELD, M.D. Cantab., M.R.C.P. Lond., Physician, Metropolitan Hospital; Senior Demonstrator of Pathology, St. Bartholomew's Hospital.—(Illustrated). .... 488

The Technique of the Preparation of Culture Media containing Albuminous Fluids, in particular for the Growth of the Meningococcus. By P. FILDES, M.B., B.C.Cantab., Assistant Bacteriologist to the London Hospital; Working on Behalf of the Medical Research Committee at the Royal Naval Hospital, Haslar. .... 489

A Case of Shell-wound of the Heart causing Complete Heart-block. By C. HOBART LEA, M.D. Vict., M.R.C.P. Lond., late Captain, Royal Army Medical Corps; Honorary Physician, Aneurin's Hospital, Manchester.—(Illustrated) ..... 493

Metabolism in Gout. By WILLIAM BAIN, M.D. Durh., F.R.C.P. Lond. (From the Physiological Laboratory, King's College, London). .... 494

### JOURNALS:

Quarterly Journal of Medicine. Edited by William Osler, J. Rose Bradford, A. H. Garrod, R. Hutchinson, H. D. Rolleston, and W. Hale White. Vol. X., Nos. 37 and 38. .... 496

Journal of Nervous and Mental Disease. .... 496

### LEADING ARTICLES.

MEDICINE AND STATE CONTROL. .... 497

THE PREVALENCE AND TREATMENT OF CEREBRO-SPINAL FEVER. .... 498

### ANNOTATIONS.

Workhouses and Food Restrictions. .... 499

The Nation's Tobacco Bill in War-time. .... 500

Vesical Calculus after Wounds of the Bladder. .... 500

Tuberculosis of the Tongue. .... 500

Nursery Schools. .... 501

Small-pox in Germany. .... 501

The Estimation of the Uric Acid of the Blood in Bright's Disease. .... 501

Tenia Nana in Holland. .... 502

### URBAN VITAL STATISTICS:

English and Welsh Towns. .... 508

Scotch Towns. .... 508

Irish Towns. .... 509

Vital Statistics of London during February, 1917. .... 509

Analysis of Sickness and Mortality Statistics in London during February, 1917. .... 509

### SPECIAL ARTICLES.

Memorandum upon Surgical Shock and Some Allied Conditions ..... 502

Public Dental Service: Dental Clinics. .... 505

The Belgian Doctors' and Pharmacists' Relief Fund: Subscriptions.—The Appeal for Surgical Instruments. .... 506

Paris: The Treatment of Gas Asphyxia—Fractures of the Humerus in Grenade-throwners.—Parasitic Haemoptysis in Yellow Raas. .... 507

Canada: The Medical Profession in Canada and the War.—The Freedom of the Canadian Expeditionary Force in Canada from Enteric Fever.—Canadian Medical Association.—McGill University and the War.—Medical Inspection of Schools in Toronto. .... 507

The Services. .... 508

### CORRESPONDENCE.

"Soldier's Heart" (Dr. Thomas Lewis) .... 510

The Mobilisation of the Dental Profession (Mr. F. Newland-Pedley) .... 510

Specificity in Antiseptics (Dr. Wm. Parry Morgan) .... 510

The Closure of Colotomy Openings (Mr. Ernest Finch) .... 511

Simple Ulcer of the Esophagus (Dr. James Miller) .... 511

The Criminal Law Amendment Bill (Dr. Robert E. Reatou) .... 511

Economy in Rubber Gloves (Captain N. I. Spriggs, R.A.M.C. (T.)) .... 511

The Right and Left Hands. .... 516

### THE WAR.

The Casualty List. .... 512

The Honours List. .... 512

Deaths among the Sons of Medical Men. .... 512

Hospital Ship Torpedoed. .... 512

War Hospital Work in Hampshire. .... 512

The Training of the Disabled Soldier. .... 512

Military Hospital Magazines. .... 512

### OBITUARY.

John Mortimer, M.B. Lond., M.R.C.S. Eng., Consulting Surgeon, Exeter Dispensary. .... 513

Arthur Edward Pernowman, M.D. Lond., M.R.C.S., L.S.A., F.R.C.P. Cantab., J.P. .... 513

### MEDICAL NEWS.

The Swedish Royal Academy of Science. .... 491

Alexandra Nurses' and Maternity Home, Devonport. .... 491

South Devon and East Cornwall Hospital, Plymouth. .... 493

The Campaign against Venereal Diseases in Belfast. .... 496

Royal Society of Arts, Indian Section. .... 508

University of Durham, Faculty of Medicine: Pass list. .... 513

University of Manchester: Pass list. .... 513

University of Liverpool: Pass list. .... 513

Queen's University of Belfast: Pass list. .... 513

University of Aberdeen: Degrees conferred. .... 513

The Röntgen Society. .... 513

Doctors of Military Age: The Squabble at Omagh. .... 513

The Health of the United States Army. .... 513

### PARLIAMENTARY INTELLIGENCE.

Notes on Current Topics: Criminal Law Amendment Bill—Military Service (Review of Exceptions) Bill. .... 514

House of Commons: Commissioned Dental Surgeons—Classification of Men in the Army.—Poisoning Wells on Western Front.—Infantile Death-rate.—Abdominal Operations at the Front. .... 514

Appointments. .... 516

Vacancies. .... 516

Births, Marriages, and Deaths. .... 515

Notes, Short Comments, and Answers to Correspondents. .... 516

Medical Diary. .... 517

Meteorological Readings. .... 517

Editorial Notices. .... 517

Manager's Notices. .... 518

Acknowledgment of Communications received. .... 518

FOR INDEX TO ADVERTISEMENTS SEE PAGE 2.

## DANIELS' TROPICAL MEDICINE and HYGIENE

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## I N D E X

## MEDICAL AND OTHER BOOKS AND PUBLICATIONS

PAGE	PAGE	PAGE	PAGE
<b>BAILLIERE, TINDALL &amp; COX.—</b>	<b>CHURCHILL, J. &amp; A.—</b>	<b>FROWDE, &amp;c.—(Continued).</b>	<b>SAUNDERS CO.—(Continued).</b>
Blair Bell's The Sex Complex Cover	Davies—Minor Surgery .... Cover	Waring—Manual of Operative Surgery ..... 4	Moorhead—Traumatic Surgery .. 3
Cobb—The Organs of Internal Secretion..... Cover	Jellett—A Practice of Gyneco- logy ..... Cover	KIMPTON—	Moorhead's Traumatic Surgery and other New Books ... Cover 1
Freyer—Enlargement of the Pro- state..... Cover	Jellett—A Short Practice of Gynaecology ..... Cover	Roth—Notes on Military Ortho- pedics ..... Cover	Spear—Nervous Diseases .....
Freyer—Surgical Diseases of the Urinary Organs .....	Squire's Companion to the British Pharmacopœia ..... Cover	KMEDICAL PUBLISHING CO.—	Winslow—Prevention of Disease.. 3
Gordon—Manual of Surgical Anesthesia..... Cover	DANIEL.—	Lane, Sir A.—Operative Treat- ment of Fractures ..... Cover	<b>MEDICAL LIBRARIES, &amp;c.—</b>
Lochhart-Mummery—Diseases of the Colon and their Surgical Treatment..... Cover	Rabagliati—Initia or Nutrition and Exercises..... 4	NISBET & CO.—	Baker—Books .....
<b>BALK, SONG &amp; DANIELSON.—</b>	FROWDE AND HODDER & STOUGHTON.—	Romer and Creasy—Bonesetting and the Treatment of Painful Joints ..... Cover	Behnke—Stammering, Lipping, & Cleft Palate Speech .....
Daniels—Tropical Medicine and Hygiene..... 1	Waring—Surgical Diseases of the Gall Bladder, Bile Ducts, and Liver Their Pathology, Dia- gnosis, and Treatment ..... 4	SAUNDERS COMPANY—	Ketley—Stammering .....
Worth—Scutis: Its Causes, Patho- logy and Treatment.... Cover	Montgomery—Care of Surgical Patients ..... 3	Lewis's Circulating Library Cover	Matthews—Wood: Application of Trusses to Hernia .....
			Scholl Mig. Co.—Scientific Correc- tion for Alliments of the Feet ..

## **OFFICIAL AND GENERAL ANNOUNCEMENTS**

<b>ASSISTANCES, MEDICAL</b> .....	<b>48</b>	<b>ASYLUME</b> —(Continued).	
<b>ASYLUM, HOMES, &amp;c.</b> —		Nordrach-on-Dee, Banchory .....	45
Ashwood House, Kingswinford .....	41	Northumberland House, Finsbury Park .....	45
Barnwood House Hospital .....	41	Northwoods House, Winterbourne .....	45
Bishopstone House, Bedford .....	41	Otto House, West Kensington .....	41
Bruntoun House, Lancaster .....	41	Pochum House .....	43
Chesterwell House, Peckham-road .....	44	Pendyrrin Hall Sanatorium, Nor- wich-in-Wales .....	44
Cheddie Royal .....	42	Plympton House, Plympton .....	42
Clarence Lodge, Clapham Park .....	41	Potternewton Corporation Mental Hospital .....	41
Cothurst House School, Alderley Edge .....	41	Royal Carlisle Institution for Mental Defectives .....	43
Co-operative Sanatorium, Billericay .....	49	St. Andrew's Hospital, Northampton .....	42
Coppice, The, Nottingham .....	42	St. George's Retreat, Burgess Hill .....	42
Court Hall, Kenton, near Fetter-lane .....	45	Sandfield House Private Asylum, Bedford .....	41
Dalrymple House, Rickmansworth .....	44	Stretton House, Church Stretton .....	42
David Lewis Colony, Alderley Edge .....	41	The Grange, near Rotherham .....	42
Duff House, Banff .....	46	Vale of Clwyd Sanatorium .....	44
General Manager, Craven street .....	45	Warmsfield Asylum, Oxford .....	41
Ghyllwood Sanatorium .....	44	Wenstholme, Torquay .....	41
Grove House, Church Stretton .....	42	Wye House, Buxton .....	42
Grove, The, Cattistock, Norfolk .....	42		
Hallsmere Nursing Home .....	45		
Haydock Lodge, Newton-le-Willows .....	45		
Heighgate Hall, Norwich .....	42		
Homes for Inebriate Women .....	44		
Hove, Sussex .....	45		
Littleton Hall, Bentwood .....	45		
London Fever Hospital .....	45		
Malling Place, Kent .....	42		
Melbourne House, Leicester .....	44		
Mendip Hills Sanatorium .....	44		
Moat House, Tamworth .....	42		
Newmains Retreat, Lancashire .....	44		
Newsgarth Hall, Folton, Mid- lothian .....	43		
<b>HOSPITAL, INFIRMARY, SANATORIUM, &amp;c., VACANCIES</b> .....	<b>48-49</b>	<b>HOUSE &amp; ESTATE AGENTS</b> —	
		Bedford & Co., Wigmore-street .....	49
		Davies & Son, Upper-street .....	49
		Elliott, Son & Boyton, Ver- street .....	49
		Ley Clark, Wimpole-street .....	49
		<b>LIFE &amp; FIRE ASSURANCES, &amp;c.</b> —	
		General Life Assurance Co. .....	39
		National Provident Institution .....	39
		Prudential .....	39
		<b>MASSAGE</b> —	
		Associated Male Nurses and Masseurs .....	39
		<b>MEDICAL ACCOUNTANTS, &amp;c.</b> —	
		Turner .....	49
		<b>MEDICAL AGENTS</b> —	
		Fieldhall, Limited .....	49
		Manchester Clerical, &c., Associa- tion .....	49
		Medical Agency .....	49
		Needles, J. C. .....	49
		Peacock & Hadley .....	49
		Turner .....	49
		<b>MEDICAL SCHOOLS</b> —	
		(LONDON)	
		London School of Clinical Medi- cine .....	38
		St. Mary's Hos. Medical School .....	38
		West London Post-Graduate College .....	38
		(PROVINCIAL, &c.)	
		School of Medicine of the Royal Colleges, Edinburgh .....	38
		University of Durham College of Medicine, Newcastle-upon-Tyne .....	38
		<b>PARTNERSHIPS &amp; PRACTICES</b> , 49	
		<b>TUTORS &amp; LECTURERS</b> —	
		Medical Correspondence College .....	39
		Weymouth .....	39

## **TRADE AND MISCELLANEOUS ADVERTISEMENTS**

<b>AMBULANCES</b> —		
Dalmir Company— Motor Ambulances for hire	7	
St. John Ambulance— Invalid Carriages	6	
<b>BOTTLE MERCHANTS</b> —		
Isaacs	26	
<b>CARRIAGES, MOTORS, &amp;c.</b> —		
Armstrong-Liveries	6	
Brown Brothers— Ducor Spring Cutters	6	
No. 51, L.O., Strand— Alliday Coupé	40	
Seabrook Bros.— R.M.C. Courré	49	
Ware & De Freville Ltd.— Motor Cars	6	
<b>CHEMISTS &amp; DRUGGISTS</b> —		
Allen & Hanbury— Allenburys Throat Pastilles	13	
Bryce Lecthin, &c.	18	
Soturo!	17	
Anglo French Drug Co.— Supasalv, Mersalv, Ambrosia, Klipseine	26	
Antiphlogistin...	26	
Boots Pure Drug Co.— Aspirin Compressed Tablets, &c.	10	
British-Myers Co.—Sal Hepatica	32	
British Drug Houses Ltd.— Intramining	12	
British Organotherapy Co., Ltd.— Prostactic Extract, Thyroid Ex-		
British Oxygen Co.—Oxygen	9	
Brunswick, Welcome & Co.— Tabloid Brain Aspirin, Quinine Compound, Podium Salicylate, Sodium Citrate	22	
Products for Wassermann Re- action, Products for Treat- ment	23	
Carnick (G. W.) Co.— Trypogen	24	
Christy & Co.— Glyco-Thymoline	14	
Glyco-Heroin	32	
<b>CHEMISTS</b> —(Continued).		
Crookes' Laboratories— Colloids	50	
Établissements Poulenç Frères— Stovaine	9	
Fellows Medical Mfg. Co.— Follows' Syrup	8	
Gale & Co.—Elixir Cresolis & Heroin Co., &c.	32	
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Haller-Mallot	33	
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Howards' Sodii Bicarb.	32	
Lambert Pharmaceutical Co.— Listerine	11	
Macfarlan's &c.— Anest'etic Ether	32	
Maitine Manufacturing Co.— Useful Compounds	21	
Moore & Co., Ltd.— Lymp-Pure-Salt	35	
Newberry Sons— Pulvis Jacobi Ver.	36	
New York Pharmaceutical Co.— Lyndon's Viburnum Compound	9	
Parkes, Davis & Co.— Takla Diastase	16	
Raines, Dr., Singer's Nutritive Suppositories	26	
Richards & Sons— Antikatarrhine Tablets	28	
S.P. C. Charges Co.— Sulphaque	33	
Squire & Sons— Kask, K.-sen, Semine, Eas. Sonne aromat	Cover iv	
Wilcock, Jozsef & Co.— Arhæol.	33	
Willows, Francis, Butler & Thompson— Physiologically Tested Drugs	50	
<b>DISINFECTANTS</b> —		
Condy's Fluid	6	
Jevex Sanitary Compounds Co.— Jevex Fluid, &c.	Cover II	
<b>FOODS</b> —		
Baker's Flour Supply Co.—Flour	49	
Benger's Food	20	
Blatchley's Diabetic Preparations	53	
Brand & Co.—Meat Juice	28	
Cadbury's Cocoas	35	
Callard & Co.—Diabetic Foods	35	
Carmick & Co.—Dry Peptoneoids	21	
Freemans Real Turtle Soup	35	
Fry's Malted Cocoa	Cover III	
Manhu Food Co.— Manhu Diabetic Foods	35	
Pan Yan Pickle	24	
Rowntree's Elect Cocao	34	
Southall Bros. & Barnard—Vitamin	34	
Valentine's Meat-Juice	27	
Vif-Cocao	35	
Wander, Ltd.—Ovaltine	11	
<b>FURNITURE</b> &c.—		
Carter—Furniture for Invalids and Hospital Supplies	30	
<b>HOSPITALISATION</b> —		
Humphreys, Lim-ted— Mobile Hospital Buildings	31	
Sailors' and Soldiers' Mobile Panel Huts and Hospital Wards	31	
<b>MED. &amp; SURG. APPLIANCES</b> —		
Bailey & Son—Bath Trusses, &c.	7	
Cocking—Adaptable Porc-Plastic Jackets and Splints	36	
Davis—Lukens Sterile Catalog with Dulox Needle	5	
Davis & Geck— Sutures fit for Surgery	37	
Holland & Son—Patent Foot Appliances	5	
Leslies' Zophia	Cover II	
Milntkin & Lawley— Osteology, &c.	Cover III	
Precious Metals Temporing Co.— Tempered Gold Hypodermic Needles	35	
Robinson & Sons—Gauze Tissue	56	
Scholl Mfrs. Co.— Scientific Appliances for the Relief of Foot Ailments	37	
<b>MED. APPLIANCES</b> —(Continued).		
Timpson & Co.— Canthos Blister Plaster	36	
Whitelow— Stand for Hanging Irrigators and Saline and Salvarsan Irrigators, &c.	5	
Wolfe & Hollander— Wolfson Restful hair	5	
Wright, Ltd.— Household Medical Battery	38	
Zeal—Repele Clinical Thermo- meter	37	
<b>MINERAL WATERS</b> , &c.—		
Hogg & Son— Aerated Lime-Water	35	
Vichy-Célestins	28	
<b>OPTICIANS</b> :		
Watson & Sons, Ltd.— Microscopes	37	
<b>SANITARY APPLIANCES</b> , &c.—		
Slack & Brownlow— Brownlow Filter	29	
<b>TAILORS, BOOTMAKERS</b> , &c.—		
Burberry— The Burberry	29	
Burberry Service Dress	28	
Harry Hall—Service Dress	6	
<b>TYPEWRITING</b> , &c.—		
Yost Typewriter Co.—Yost	37	
<b>VACCINE LYMPH</b> —		
Chaumier's Cal' Lymph	36	
Jenner Institute for Cal' Lymph	38	
<b>X-RAY, &amp;c., APPARATUS</b> —		
Medical Supply Association— Greville Improved Diathermy Apparatus	34	
<b>MISCELLANEOUS</b> :		
No. 51, L.O., Strand— Secretary or Attendant	48	
Walker, Brixton Hill—Secretary	48	

A Lecture

ON THE

CONDITIONS WHICH GOVERN THE GROWTH  
OF THE BACILLUS OF "GAS GANGRENE"  
IN ARTIFICIAL CULTURE MEDIA,  
IN THE BLOOD FLUIDS *IN VITRO*, AND IN THE  
DEAD AND LIVING ORGANISM.

*Delivered before the Royal Society of Medicine on  
Dec. 18th, 1916,*

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My subject-matter to-day is not, as on previous occasions, the general question of the treatment of infected wounds. It is a much narrower issue. I would propose to consider with you the conditions which respectively promote and inhibit the growth of the "gas gangrene" bacillus of Welch, but here also I shall have in view a purely practical end. The investigation of the conditions which favour or hinder the growth of the organism here in view has, as I see it, only one possible object. That is to conduct sooner or later to the saving of life and limb.

I may, I think, take it as certain that clinical observation is incompetent to furnish us with any precise information regarding the conditions with favour or impede the growth of the bacillus of gas gangrene, and that such information can be obtained only by laboratory investigation. But that does not mean—and we must never lose sight of this—that we can place unrestricted confidence in inferences based upon laboratory experiments. For in laboratory experiments we make for ourselves artificially simplified conditions; and confine our attention to a very limited number of factors. By virtue of this we are subject to make erroneous generalisations, concluding that what holds true under the conditions obtaining in the laboratory experiment will hold true universally. Presumptions of that kind can be avoided only by continually extending and critically revising our laboratory experiments and organising inquiries to find out whether our doctrines really give good results in practice.

And it is specially necessary to take these precautions when therapeutic procedures are based upon laboratory data. For quite a large proportion of such therapeutic procedures rest either upon generalisations which do not apply outside the conditions which are obtained in the experiments, or else upon generalisations which emphasise the thing that is unimportant to the prejudice of the thing that is important. I have in my mind, for example: the doctrine that antiseptics will sterilise an infected wound; and, in connexion with my present subject-matter, the doctrine that the growth of the gas-gangrene bacillus pivots upon the presence or absence of oxygen. It will provide me with a convenient point of departure to invite you to consider what is the experimental basis of this doctrine.

I. CONDITIONS WHICH GOVERN THE GROWTH OF THE  
BACILLUS OF WELCH IN ARTIFICIAL MEDIA.

To practically all of us the most important scientific datum ascertained with regard to the bacillus of Welch is that it will not grow in the presence of air. And this datum, firmly believed, has dominated all surgical thinking in the domain of gas gangrene. It has led to the employment of oxygen or peroxide of hydrogen injected into the tissues as a sovereign remedy against the progress of gangrene. And it has suggested that the advantage of thoroughly opening up a wound infected by anaerobes is, in the main, advantage derived from letting in the air.

But the thesis upon which all this rests—the thesis that the bacillus of Welch cannot grow and multiply in a presence of air—is as a matter of fact erroneous. It was discovered by Tarozzi that when pieces of animal tissue were added to bouillon cultures of anaerobes could be obtained in open tubes. Ori and Wrzosek, following up this work, showed that the same result could be obtained with pieces of either raw or autoclaved potato, and also with other vegetable tissues. Nor are these, as might be supposed from the fact that we have continued to think along the old

lines, very recent discoveries; nor, again, do the aerobic cultures of anaerobes here in question yield only meagre growth. Quite the contrary. The work of Ori and Wrzosek dates back already some ten years. And in reality the cultures of the bacillus of Welch grown in the open in bouillon containing a piece of potato are characterised by very rapid and vigorous growth, with gas production. So vigorous in point of fact is the growth of the bacillus of Welch in the open potato bouillon tube, that this method furnishes, it would seem, the best method for isolating the microbe from specimens of pus in those cases where the organism is present in only very small numbers.

There are displayed before you here a series of open culture tubes implanted with the bacillus of Welch, all showing by their turbidity and by foaming how vigorous is the growth. And, in order that the erroneous mental images which the appellation "anaerobes" nurtures in the mind may be obliterated, I have ranged up before you here also cultures in open of a variety of other anaerobes. And let me say that so far we have not obtained any anaerobe from a wound which cannot by proper devices be made to grow freely in open tubes.

You can see that it follows from this, that we cannot possibly promise ourselves that if we introduce oxygen into the tissues, or admit air to the interior of the wound cavity, we shall thereby inevitably arrest a gangrene bacillus infection. Or, putting the conclusion in more general form, we see that the therapeutic principle of combating anaerobes by combating anaerobic conditions cannot be regarded in any sense as an adequate therapeutic principle.

Let us be careful to read the lesson of these tubes aright. All that they teach is that anaerobic microbes can be got to grow with astonishing freedom in culture tubes fully open to the air. But it is not thereby established that the presence of oxygen is either indifferent or congenial to anaerobic microbes. And, in point of fact, it has been suggested, and the view is *a priori* tenable, that the potato may provide some reducing agent which by holding off the oxygen of the air at the outset enables the microbes to get a start, the subsequent growth being due to anaerobic growth in a medium deprived of air by the generation of gas in the culture. This hypothesis that the potato furnishes a reducing substance which gives the culture a start seems to win support from the fact that the potato bouillon gives much less vigorous cultures when stale than when freshly prepared. And, again, the traditional view that oxygen is inimical, or at least uncongenial, to the growth of the class of microbes denoted "anaerobes" does not entirely lack support. When after implanting I empty out the major part of the contents of a potato bouillon tube, reserving only a few c.c.'s, and then lay the tube on its side in the incubator, I get only a very meagre culture. The same holds true when I draw a continuous stream of air bubbles through the culture, and again in the case when cultivating in a capillary tube, I break up my column of fluid by intercalating a number of air bubbles. Moreover, when I endeavour to subculture from the meagre cultures of anaerobes grown under such conditions of maximum exposure to air, I am practically always unsuccessful. But all these considerations do not avail to obscure the fact that we are required to abandon the traditional view that the growth of anaerobes pivots upon the presence or absence of oxygen. And after taking cognisance of these cultures in open tubes we are intellectually impoverished to the extent that we see that the doctrine of anaerobic growth that, as we thought, held unrestrictedly, holds true only with limitations.

Intellectual impoverishment is, however, impetus to research. And now that the presence or absence of oxygen turns out not to be the factor which controls the growth of the bacillus of Welch, there is stimulus to try to find out what is the controlling factor, or rather what are the controlling factors. For—it being in the order of nature that things should never be too easy—there are bound to be many controlling factors. I and my fellow workers, Major Georges Dreyer at Boulogne and Dr. Alexander Fleming at St. Mary's, have consequently set ourselves to search for these controlling factors. In each case we set out to look for mechanical factors which might favour or hinder the growth of the bacillus of Welch.

The first question to which investigation was directed was the question as to what would be the effect of in the one case dispersing the implanted microbes through the culture

medium, and in the other case concentrating the infection in some one region of the culture medium. I had already 17 years ago, in a study\* of the distribution of agglutinins and bactericidal substances in the body in cases of typhoid and Malta fever, called attention to the circumstance that microbes which would if carried into the blood stream have been killed or impeded in their growth by the bacteriotoxic powers of the blood succeeded in maintaining themselves alive in the internal organs, collected together in what I called "niduses of lowered bacteriotoxic pressure"—i.e., in regions where because collected together they can by active and passive chemical force maintain conditions propitious to their survival. In view of this analogy, and in view also of the circumstance that for the successful starting of a culture of the bacillus of Welch a large implantation is usually required, it appeared not unreasonable to inquire from experiment whether concentration of the infection comes into account also in connexion with growth upon artificial media.

The experiments were in each case carried out with measured volumes of glucose broth implanted with graduated additions of a suspension of Welch's bacillus, and cultivated anaerobically in capsules of glass tubing or capillary pipettes. In each case duplicate volumes were taken, and the one tube was cultivated lying flat and the other in the upright position—the microbes in this latter being concentrated at the bottom either by gravitation or centrifugation. In every series of such experiments—and in all eight were performed—the advantage from the point of view of successful cultivation of the microbe was with the series of tubes that were incubated in the upright position. The following may serve as an illustrative experiment.

#### Experiment 1.

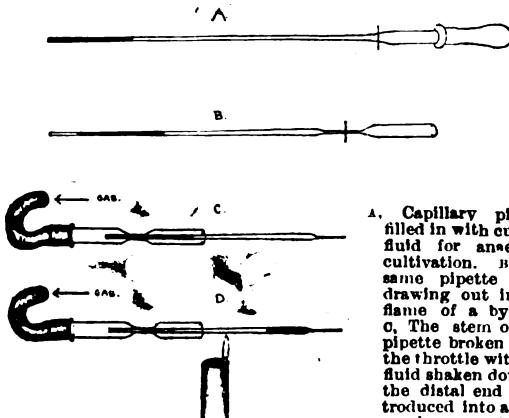
A 24 hours culture of the bacillus of Welch, grown upon serum agar<sup>1</sup> in an atmosphere of coal-gas sealed up in a test-tube drawn out in the blow-pipe flame, was suspended in a convenient quantity of glucose broth. This suspension, enumerated in a Thoma-Zeiss cell, was found to contain 220,000,000 microbes (the actual figure arrived at was 217,600,000). From this a graduated series of dilutions were made in glucose broth. Two 20 c.mm. volumes of each dilution were then taken up into graduated capillary pipettes and anaerobic conditions were provided by driving the column of fluid down to the throttled distal end of the tube and then sealing up the proximal end filled with coal-gas.<sup>2</sup>

\* THE LANCET, 1899, II, 1727.

<sup>1</sup> Serum or blood agar—i.e., agar which has been flushed with a very minute quantity (10 c.mm. is enough) of blood or serum—furnishes, in my experience, a very much more satisfactory culture medium for the bacillus of Welch than ordinary agar. Not only does it give a more abundant culture but we obtain a much larger proportion (in the present experiment 100 per cent.) of living microbes. That ordinary agar provides in many instances a comparatively unfavourable culture medium would seem to be deducible also from Miss Robertson's careful work. For her result—the result that colonies of the bacillus of Welch contain even after repeated platings an admixture of other anaerobic microbes—would seem to me to indicate that her medium grew the bacillus of Welch very badly in pure culture and satisfactorily only when admixed with other anaerobes which functioned as foster-nurses.

<sup>2</sup> The most convenient method of culture for experiments such as this is the "gas-piston" method illustrated in the accompanying figure.

FIG. 1.



d. After the fluid has been driven down to the distal end of the pipette by the piston action of the gas the tube is sealed up at the tip, and then in its middle in the flame of a by-pass.

The cultural results are here set out in tabular form.

#### Experiment 1.

Serial number of the dilution.	Number of microbes in 20 c.mm. of that dilution.	Cultural result in the tube standing upright.		Cultural result in the tube lying flat.	
		After 24 hours.	After 48 hours.	After 24 hours.	After 48 hours.
1	400,000	Growth	Growth	Growth	Growth
2	80,000	Growth	Growth	Growth	Growth
3	16,000	Growth	Growth	Growth	Growth
4	3,200	Growth	Growth	Growth	Growth
5	640	Growth	Growth	0	Growth
6	128	Growth	Growth	0	Growth
7	25	Growth	Growth	0	Growth
8	5	0	Growth	0	0
9	1	0	Growth	0	0

An effect essentially similar to that produced by collecting the infection into a restricted region of the cultural fluid ought, as reflection will show, to be achievable also by dividing up the culture medium by a series of partitions. For the chemical effort which the microbes will have to put forth for the transformation of the provided culture medium into a really propitious medium will, when that is divided up, be concentrated upon a fraction of the whole.

The experiment, conducted in duplicate, set out in the table below seems to indicate that this does hold true.

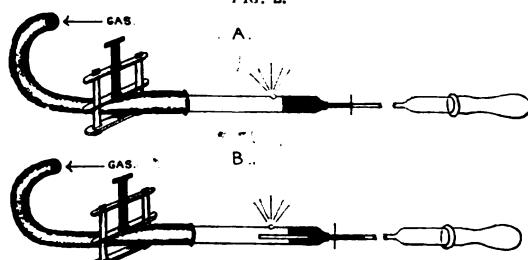
#### Experiment 2.

Serial number of the dilution.	Number of microbes in each 100 c.mm. of the dilution.	Volume of dilution taken for anaerobic culture in tubes lying flat.			
		100 c.mm. as a single unit.		100 c.mm. divided up by gas <sup>3</sup> into five units of 20 c.mm.	
		A.	B.	A.	B.
1	102,400	+	0	+++ + 0	++++ + 0
2	20,480	+	+	+ 0 0 0 0	+ + 0 0 0
3	4,096	+	+	0 + 0 0 0	+ + + 0 0
4	820	+	0	+ + + + 0	0 0 0 0 0
5	165	+	+	0 + 0 0 0	+ + 0 0 0
6	36	+	+	+ + + 0 0	+ 0 0 0 0
7	7	+	0	0 + + 0 0	+ + 0 0 0

Other and more interesting experiments falling entirely into line with those which have been in question above are the experiments devised and carried out by Dr. Alexander Fleming. You have these cultural experiments in open tubes displayed for view here. We have, first, a culture of the bacillus of Welch obtained by introducing a pledget of asbestos into glucose broth left open to the air; secondly, a culture obtained under the same conditions with a pledget of cotton-wool; thirdly, a culture obtained by the addition of platinum black; fourthly, one obtained with a rust-covered nail; and fifthly, a culture obtained by introducing into the open bouillon a hair-fine capillary glass tube filled in with a minute quantum of a diluted culture. When we take cognisance of all these—and you see we have here in each case a turbid and vigorous gas-producing culture—and when we bring what we see here into relation with the fact that we obtain cultures also in open tubes containing potato,

<sup>3</sup> The dividing up of the column of fluid by bubbles of gas was carried out by the technique depicted in the subjoined figure.

FIG. 2.



Method of filling into the stem of a capillary pipette a series of unit volumes of culture fluid separated by bubbles of gas. A. Showing method of filling in the first unit volume of culture fluid. B. Fiduciary mark on distal portion of the stem of capillary pipette. B. Showing method of filling in gas to partition off the successive unit volumes of culture fluid.

carrot, white haricot beans, bread, cabbage, cheese, earth, desiccated and ground-up albumin, and other additions, it comes home to us that the common factor here must almost certainly be a mechanical factor. And that mechanical factor would appear to be the providing of some hole or cranny to serve as a nidus in which the microbe can get a start by concentrating its chemical effort at first upon a fractional portion of the provided culture medium. Again, when we look beyond these test-tube experiments to clinical facts we see that the supervention of gangrene is very frequently correlated with the leaving behind in the wound of infected portions of clothing; we see, in other words, that the same mechanical factor which is operative in the test-tube experiment would seem to come into account also in the body.

## II. CONDITIONS WHICH GOVERN THE GROWTH OF THE BACILLUS OF WELCH IN THE BLOOD-FLUIDS.

### (a) Bactericidal Factor.

In the matter of the culture of the bacillus of Welch in the blood-fluids the factor which more than any other factor comes into account is—and this was shown by Captain d'Este Emery when he was my fellow worker at Boulogne—the bactericidal action of the serum. The following experiment shows how considerable is this restraining and bactericidal action of the normal serum. It brings out also the fact that the implanted microbes have a better chance of surviving and establishing themselves when collected together than when dispersed through the blood fluids.

### Experiment 3.

This experiment was a companion experiment to Experiment 1 (*supra*), and is to be read in connexion with it. The same bacterial suspension was employed and the procedure was, except in the respect that the dilutions were made in the author's serum instead of in glucose broth, the same.

#### Experiment 3 (Companion to Experiment 1).

Serial number of the dilution.	Number of microbes in 20 c.m.m. of that dilution.	Cultural result in the tube incubated upright.	Cultural result in the tube incubated lying flat.
1	400,000	Growth	Growth
2	80,000	Growth	0
3	16,000	0	0
4	3,200	0	0
5	640	0	0
6	128	0	0
7	25	0	0
8	5	0	0
9	1	0	0

We see here (computing from the figures for the tubes lying flat, i.e., the tube in which the microbes were dispersed through the culture medium) that 1 c.c. of normal serum was capable of disposing of an implantation of 4,000,000 ( $80,000 \times 50$ ) gas gangrene bacilli, all of which bacilli were (as the control experiment, Experiment 1, shows) living bacilli.

### (b) Mechanical Factor.

Also we can see here that advantage accrues to the blood-fluids when the microbes are dispersed and cannot coöperate, and disadvantage when the microbes are collected together and afforded an opportunity of making a combined attack. The influence of this factor of dispersing or concentrating the infection comes out more clearly when we make similar implantations into duplicate volumes of serum, we centrifuge the tube containing the one portion and incubate it upright, and leave the other tube uncentrifuged and incubate it lying flat.

In the following experiments the cultures were made anaerobically by the "gas-piston" method. The implantations were in Experiments 4 and 5 made by the "method of

### Experiment 4.

Amount of microbial suspension implanted into serum.						
Washes.						
	4	3	2	1	$\frac{1}{2}$	$\frac{1}{4}$
Centrifuged tubes incubated upright ... ... ...	Growth	Growth	Growth	0	0	0
Uncentrifuged tubes incubated lying flat ... ... ...	Trace	0	0	0	0	0

### Experiment 5.

	Amount of microbial suspension implanted into serum.				
	2	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$
Centrifuged tubes incubated upright ... ... ...	Growth and gas	—	Growth and gas	Growth and gas	Growth only
Uncentrifuged tubes incubated lying flat ... ... ...	Trace	Trace	Trace	0	0

washes," i.e., they were made by filling into the pipette a unit volume of serum, then filling in a unit volume of the microbial suspension or a dilution of this suspension, expelling this, and incorporating the microbes left behind into the unit volume of serum. In Experiment 6 graduated dilutions of the bacterial suspension were made in serum.

### Experiment 6.

	Bacterial suspension progressively diluted with neutralised serum.						
	2 fold.	4 fold.	8 fold.	16 fold.	32 fold.	64 fold.	128 fold.
Centrifuged tubes incubated upright ... ... ...	Gr.	Gr.	Gr.	Tr.	Tr.	Tr.	0
Uncentrifuged tubes incubated lying flat ... ... ...	Tr.	Tr.	Tr.	0	0	0	0

Gr. = growth ; Tr. = trace.

It comes out, as you will see, quite clearly in these experiments that the doctrine of the "non-bacteriotropic nidus"—which I suggested to explain the survival of microbes in an organism which has in its blood stream an ample provision of protective substances—is a doctrine which applies also to cultivations in serum conducted *in vitro*. And the full details of the experiments, if there were room to give them here, would bring out that the more rapidly the concentration of the implanted microbes is effected, and the shorter the preliminary exposure to the full bactericidal action of the serum, and again the less bactericidally potent the serum, the greater becomes the chance that an implanted microbe will get a start and go on from that to produce a generalised infection.

Up to this point the problem of the conditions which govern the growth of the bacillus of Welch in the blood-fluids has been treated as if practically all that was of moment was to withdraw by mechanical methods the implanted microbes from full exposure to bactericidal power of blood-fluids. But even here the factor which is in ultimate analysis the operative factor is, of course, the chemical factor. What comes into account is, on the one hand, the diminished mass effect exerted by the bacteriotropic action of the serum upon the microbes; and, on the other hand, the increased mass effect exerted upon the phylactic elements of the blood-fluids by the products elaborated by the chemical activity of the microbes.

When the bacillus of Welch grows freely in serum it reduces the antityptic power of the medium and it elaborates acid. Concurrently, as it would seem with this, the microbe starts to grow with phenomenal rapidity after the manner of an avalanche gathering force as it goes. Our next task must be to inquire whether there is any causal relation between the reduction of antityptic power and the avalanche-like progression of the culture.

(o) *Experiments showing that the Culture of the Bacillus of Welch in Serum is Largely Governed by the Antityptic Power of the Blood.*

The question as to what it is that converts the pus of neglected wounds into an ideally propitious culture medium for the gangrene bacillus and every other species of microbe presented itself very early in the course of this war. To that question I proposed an answer, and I think with every day it has become clearer that it was the right answer. That answer was to the effect that what stands in the way of free growth of all micro-organisms in the blood-fluids is the antityptic power. We have to suppose in connexion with this that the antityptic power inhibits the digestive processes which must precede the conversion of the native albumins of the blood into congenital pabulum for

microbes. It therefore seemed to follow that if trypsin were directly added to the blood-fluids, or else if trypsin were indirectly added, and this is what occurs in stagnant pus by the disintegration of the leucocytes, we should have a corruption of the discharges, every manner of microbe cultivating itself there without restraint. In brief, what I suggested was that the antitryptic power is the guardian of the blood. In connexion with this I would point to the experiments of my fellow workers, Captains S. R. Douglas and L. Colebrook. They have shown that haemocultures, otherwise so frequently infertile, can very often be rendered fertile by the addition of trypsin to the culture medium. And the following experiments, conducted with the bacillus of Welch, show exactly the same thing.

#### Experiment 7.

A 24 hours culture of the bacillus of Welch grown upon agar flushed with serum was suspended in a convenient quantum of glucose broth. This was found to contain 350 millions of bacilli per c.c. Graduated dilutions of the suspension were then made in a serum (A. E. W.'s) which neutralised an equal bulk of a 25-fold dilution of trypsin. Another precisely similar series of dilutions was made in another sample of the same serum to which had been added 1/25th of its bulk of the same sterile trypsin undiluted. Six 20 c.m.m. volumes of each successive dilution of either serum were then taken up into calibrated capillary pipettes for anaerobic cultivation. The cultural results as determined by microscopic examination were as set out below.

Serial number of the dilution.	Number of microbes in the 20 c.m.m. volume which was cultivated.	Unaltered serum.		Trypsinised serum.	
		Number of fertile cultures.		Number of fertile cultures.	
		Number of	fertile cultures.	Number of	fertile cultures.
1	7,000,000	6	out of 6	6	out of 6
2	1,400,000	5	" 6	6	" 6
3	280,000	0	" 6	6	" 6
4	56,000	0	" 6	5	" 6
5	11,200	0	" 6	2	" 6
6	2,240	0	" 6	0	" 6
7	450	0	" 6	0	" 6
8	90	0	" 6	0	" 6
9	18	0	" 6	0	" 6

We see here that for the infection of 20 c.m.m. of trypsinised serum there were required 50 times fewer microbes (33,600 as contrasted with 1,700,000) than for the infection of the same quantity of unaltered serum.

#### Experiment 8.

Here in the one set of tubes a wash of trypsin followed by a wash, or fraction of a wash, of the bacillus of Welch were added to serum; in the control tubes larger quanta of microbial culture were implanted.

Control tubes	Serum + 3 washes of bacterial suspension.	No growth.
	" + 2 "	" "
	" + 1 wash "	" "
	" + ½ "	" "
Trypsin tubes	Serum + 1 wash trypsin, 1 wash bacterial suspension.	Abundant growth with gas.
	" + 1 wash trypsin, ¼ wash bacterial suspension.	"

#### Experiment 9.

Here the same procedure was followed.

Control tubes containing normal serum	Serum + 4 washes of bacterial suspension.	No growth.
	" + 3 "	" "
	" + 2 "	" "
	" + 1 wash "	" "
	" + ½ "	" "
Tubes containing trypsinised serum	" + 2 washes "	Abundant growth with gas.
	" + 1 wash "	" "
	" + ½ "	" "
" + ¼ "	" "	"

#### Experiment 10.

Here again the same technique was employed except in the respect that the trypsinised serum was prepared by adding 1 unit volume of trypsin respectively to 9, 19, and 39 unit volumes of serum. The serum was A. E. W.'s serum,

which neutralised an equal volume of a 25-fold dilution of trypsin. The cultural results were as set out below.

		Amount of bacterial suspension implanted.					
		Washes—					
3	2	1	½	¼	⅛		
Serum without addition ...	Tr.	Tr.	0	0	0	0	0
Serum + 1/40th of its volume of trypsin ...	Gr.	Gr.	Tr.	Tr.	Tr.	0	0
Serum + 1/20th of its volume of trypsin ...	Gr.	Gr.	Gr.	Gr.	Gr.	Gr.	0
Serum + 1/10th of its volume of trypsin ...	Gr.	Gr.	Gr.	Gr.	Gr.	Gr.	0

To this experiment may be added the following which brings out that there is a general but not a perfect correlation between the antitryptic power of the serum and its power of resisting infection by the bacillus of Welch.

#### Experiment 11.

Derivation of the serum.	Antitryptic power* of the serum.	Infection-resisting (physiologic) power.					
		Amount of culture implanted.					
		3	2	1	½	¼	⅛
Patient with serious compound fracture.	10 units (reciprocal of T/10).	0	0	0	0	0	0
Patient with perforating wound of chest.	6·6 units (reciprocal of T/15).	Tr.	0	0	0	0	0
Patient with gangrene infection of leg.	6·6 units (reciprocal of T/15).	Gr.	0	0	0	0	0
Patient with serious flesh wound.	5 units (reciprocal of T/20).	Gr.	Gr.	Gr.	Gr.	Gr.	Gr.
Patient with serious flesh wound.	5 units (reciprocal of T/20).	Gr.	Tr.	0	0	0	0
Normal man.	5 units (reciprocal of T/20).	Gr.	Gr.	Gr.	0	0	0

\* Here, as elsewhere, the antitryptic power was measured by finding out what dilution of trypsin was neutralised by an equal volume of serum. By dividing in each case the figure representing this dilution into 100 we obtain the reciprocals, figures which provide a very convenient expression for the results of antitryptic measurement.

#### (d) Experiments showing that the Growth of the Bacillus of Welch in the Blood-Fluids is Promoted by the Addition of Acid.

When one notes that the bacillus of Welch when growing freely in serum turns it acid; and when we then reflect upon the fact that all serum cultures of the microbe, whether *in vitro* or in the living body, begin with difficulty, and then, after reaching a certain critical point, progress at the rate of an avalanche, one inevitably, as in regard to the reduction of the antitryptic power of the serum, asks oneself whether the characteristic avalanche-like acceleration of growth may not be a direct result of this particular change in the medium. The answer is given in the following experiments.

#### Experiment 12. 1.

Seven unit volumes of serum were neutralised by the addition of 2 unit volumes of a N/10 sulphuric acid—the control sample of serum being diluted to the same extent with physiological saline solution. This done, the antitryptic power of the two samples of serum was measured. It worked out in each case as 3 (approximately)—i.e., a unit volume of

		Cultural results.						
		After-wash.						
		1st.	2nd.	3rd.	4th.	5th.	6th.	7th.
Neutralised serum ...	Gr.	Gr.	Gr.	Gr.	Gr.	Gr.	Gr.	Gr.
Correspondingly diluted serum ...	0	0	0	0	0	0	0	0

each of the sera neutralised a 40-fold and failed to neutralise a 30-fold dilution of the trypsin. These preliminaries completed, the resistance of the two sera to infection by the bacillus of Welch was investigated by aspirating into a capillary pipette a unit volume of a thick bacterial suspension, and following up in each case (I call this the after-wash method) by a series of unit volumes of serum.

These successive after-washes were divided off by bubbles of coal-gas introduced by the technique already explained (*vide* Footnote 3). The results after 24 hours culture were as shown in the preceding table.

#### Experiment 13.

As in the last experiment 7 unit volumes of serum were mixed in the one case with 2 unit volumes of N/10 sulphuric acid, and in the other with 2 unit volumes of physiological salt solution. The sera were then put away for 24 hours. The antitryptic power of each sample of serum was then tested. It worked out, in the case of the neutralised serum, as less than 3·3 units and greater than 2·5 units, in the case of the correspondingly control sample of serum as less than 4 units and greater than 3·3 units. Graduated dilutions of a suspension of Welch's bacillus were then made upon slides by the wash-volume (W/V) method—i.e., in each case a wash of bacterial suspension or implanted serum was carried over into a unit volume of serum to make the next dilution in series. An unmeasured sample of the whole series of dilutions was then drawn up into the stem of a capillary pipette, the successive volumes being separated by bubbles of coal-gas. The experiment was in the case of each serum carried out in duplicate. The cultural results were as follows.

		Cultural results.						
		Dilution—						
		2	4	8	16	32	64	128
Neutralised serum. Pipette No. 1	Gr.	Gr.	Gr.	Gr.	Gr.	Gr.	Gr.	Gr.
	" No. 2	Gr.	Gr.	Gr.	0	0	0	0
Control serum. Pipette No. 1	Tr.	0	0	0	0	0	0	0
	" No. 2	0	0	0	0	0	0	0

#### Experiment 14.

Normal serum was neutralised by the addition of N/10 sulphuric acid and then mixed with one-ninth of its bulk of a five-fold dilution of trypsin. The control sample of serum was diluted to the same extent with 0·85 per cent. NaCl solution. Both specimens were then implanted with a suspension of the bacillus of Welch by the after-wash method.

		Cultural results.							
		After-wash.							
		1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.
Neutralised and trypaninised serum Control trypsin ised serum	Gr.	Gr.	Gr.	Gr.	Gr.	Gr.	Gr.	Gr.	Gr.
	Gr.	0	0	0	0	0	0	0	0

#### Experiment 15.

This experiment given in tabular form below is self-explanatory.

Serum implanted with 3 washes of bacterial suspension ...	No growth.
" " " 2 " " "	" "
" " " 1 wash " " "	" "
Serum neutralised (by adding 2 volumes of N/10 sulphuric acid to 7 volumes of serum) and implanted with 1/5th wash of bacterial suspension	Copious growth.
Serum acidified (by adding 3 volumes of N/10 sulphuric acid to 7 volumes of serum) and implanted with 1/5th wash of bacterial suspension	Copious growth.

This series of experiments make it, as it seems to me, quite indubitable that additions of acid convert the serum into an eminently favourable medium for the bacillus of Welch, and it is clear from the data set forth in connexion with Experiments 12 and 13 that this effect is obtained quite apart from any reduction of the antitryptic power. We have seen that the converse of this last also holds true, the reduction of antitryptic power quite apart from any addition of acid, converts the serum into a very favourable culture-medium for the micro-organism. And I think there can be no question that when these two factors co-operate we have a combination which adequately accounts for the avalanche phenomenon, if I may so call it, which is the outstanding feature in the biology of the bacillus of Welch both when it grows in the blood-fluids *in vitro*, when it grows in the dead body, and when in the living body it invades the tissues, giving rise to spreading "gas gangrene." We have next to study the growth of the bacillus of Welch in the dead body.

### III. CONDITIONS WHICH GOVERN THE GROWTH OF THE BACILLUS OF WELCH IN THE DEAD BODY.

Already in Welch's very first publication upon the *Bacillus aerogenes capsulatus*—the microbe which now bears his name—it is put upon record that if a small volume of culture is introduced into the blood stream of a rabbit, and the animal is then killed and put into the incubator, the whole organism will be rapidly invaded, gas being generated in the blood, the condition known as "foaming liver" being produced, and the peritoneal cavity being, after six or more hours, blown out with gas. As soon as we set ourselves to think out what all this imports, we see that it must mean that the chemical changes occurring in the blood and liver after death transform the blood-fluids into an eminently favourable medium for the cultivation of the bacillus of Welch.

The following experiments show that this surmise is quite correct.

#### Experiment 16.

Rabbit No. 1.—The animal, injected intravenously with 3 c.c. of a broth culture of the bacillus of Welch, was killed five minutes after, and was then placed in the incubator. A sample of blood was taken before and a series of samples after injection. In each case film preparations were made and examined, and measurements of the antitryptic power and of the blood alkalinity were undertaken. These are recorded in tabular form below. In regard to the film preparations, it will suffice to say that no microbes were microscopically discoverable in any but the last specimen; here they were numerous. After six hours the animal was blown up with gas and the liver was foaming.

		Measurements of anti-tryptic power and chemical reaction of the serum.	
		Times when the samples of blood were collected.	Anti-tryptic power.
		Units.	
Immediately before injection	...	3	Alkaline, N/40
5 min. after injection	...	2	—
10 .. .. (heart blood)	...	1·6	Alkaline, N/50
3 hrs.	.. ..	1·6	N/60
6 .. ..	.. ..	—	"Acid."

\* Here and elsewhere in this paper the alkalinity of the blood was measured by the method described in the author's "Technique of the Test and the Capillary Glass Tube" (Constable, London).

We have here evidence that, presumably as a result of a destruction of leucocytes, the antitryptic power of the blood is progressively reduced, and that, no doubt as a consequence of lactic acid production in the muscles, the blood-fluids lose their alkalinity and finally become acid. One can hardly doubt that it is these changes which help forward the growth of Welch's bacillus in the dead rabbit. That the anaerobic conditions do not play here any responsible rôle will appear in connexion with Experiments 19 and 20.

#### Experiment 17.

Rabbit No. 2.—The animal was injected intravenously with 1 c.c. of an aerobically grown potato-broth culture, and was killed immediately after. As in the last case, film preparations of the blood were examined and measurements of the antitryptic power and alkalinity carried out. In films made 3½ hours after death hardly any microbes could be detected. In preparations made 4½ hours after death they numbered 6–8 to the microscopic field. At the end of six hours the animal was blown up with gas, and the liver was honey-combed with small cavities containing a foaming and tryptic fluid.

		Measurements of anti-tryptic power and chemical reaction of the serum.	
		Times when the samples of blood were collected.	Anti-tryptic power.
		Units.	
Immediately before injection	...	4·5	—
15 min. after injection (heart blood)	...	5·5	Alkaline, N/35
3½ hrs.	.. ..	4·5	N/80
4½ "	.. ..	3·6	" —
6 "	.. ..	2·2	Acid.

#### Experiment 18.

Rabbit 3.—This received intravenously 1 c.c. of a culture of the bacillus of Welch grown aerobically in potato broth, and the animal was killed 15 minutes after the injection and

placed in the incubator. Samples of blood were taken and examined as in the previous experiments. A single microbe was found in the blood film made 2 hours after death. The liver 7 hours after death was torn to pieces by gas and looked, except for the fact that its colour was a dark brown red, like a mass of coral as obtained from the swimmerets of a hen-lobster; films prepared from it showed an almost solid mass of microbes. The results of the measurements of antitryptic power and blood reaction are subjoined.

Times when the samples of blood were collected.	Measurements of antitryptic power and chemical reaction of the serum.	
	Antitryptic power.	Chemical reaction.
Immediately before injection ... ... ...	Units. 3	Alkaline, N 30
15 min. after injection ... ... ...	3	N 30
2 hrs. " " (heart blood) ... ...	1.8*	" Acid.
4 " " " " ... ...	1.6*	" Acid.

\* Measured after serum had been neutralised with washes of N/10 NaOH.

#### Experiment 19.

Rabbit 4.—A sample of blood was taken from this animal, and it was then, without receiving any injection, killed and placed in the incubator. The second samples of blood were taken 3 hours after death respectively from the S.V.C. and from the I.V.C. and hepatic vein. Sample 3 was taken from the heart 5 hours after death. The results of the measurements of antitryptic power, blood reaction, and infection resisting power are subjoined.

—	Antitryptic power.		Chemical reaction.	
Serum, Sample 1	3 units.		Alkaline, N 30	
" " 2	2		N 80	
" " 2B	Tryptic.*		Acid N 150	
" " 3	3		" N 75	

#### Infection Resisting (Phylactic) Power.

—	Amount of culture implanted.						
	Washes—						
Serum	3	2	1	½	¼	½	¼
Sample 1	0	0	0	0	0	0	0
Serum	Growth	Growth	Growth	Growth	Growth	Growth	Growth
Sample 2	and gas.	and gas.	and gas.	and gas.	and gas.	and gas.	and gas.
Serum	Growth	Growth	Growth	Growth	Growth	Growth	Growth
Sample 2B	and gas.	and gas.	and gas.	and gas.	and gas.	and gas.	and gas.

\* Determined after serum had been neutralised by washes of N/10 NaOH.

It is evident from the results set out here that the blood changes which convert the blood-fluids after death into an eminently favourable culture medium for the bacillus of Welch are chemical changes which occur spontaneously, and quite independently of the inoculation of the bacillus of Welch. Furthermore, when we consider the cultural results set out in the second of the two tables, bearing in view that the cultures were in each case made anaerobically, we recognise that the circumstance that the fact that anaerobic conditions such as these prevail in the dead body is a fact which can have nothing to do with the rapid pullulation of the microbe.

#### Experiment 20.

Here a sample of blood was taken from a cat and the animal was then immediately killed and placed in the

—	Antitryptic power.		Chemical reaction.	
Serum, Sample 1 ...	4		Alkaline, N 50	
" " 2 ...	4		N 150	
" " 3 ...	4		Faintly acid.	

#### Infection Resisting (Phylactic) Power.

—	Amount of culture which was implanted.				
	Washes.				
Serum, Sample 1 ...	3	2	1	½	¼
" " 2 ...	0	0	0	0	0
" " 3 ...	Growth and gas.	Growth and gas.	Growth and gas.	Growth and gas.	Growth and gas.

incubator. Sample 2 was taken from the heart three hours after; Sample 3 six hours after. As in the last case, the antitryptic power, the blood reaction, and infection-resisting power of these samples were measured. It will be seen that except for the fact that the antitryptic power is maintained unaltered the results are precisely the same as those obtained in the rabbit.

#### IV. CONDITIONS WHICH GOVERN THE GROWTH OF THE BACILLUS OF WELCH IN THE LIVING ORGANISM, IN PARTICULAR ON THE BLOOD CHANGES WHICH SUPERVENE (a) WHEN THE BACILLUS OF WELCH IS INOCULATED INTO THE BLOOD STREAM OR SUBCUTANEOUS TISSUE, AND (b) WHEN THE MICROBE INVADES THE TISSUES FROM A WOUND PRODUCING GAS GANGRENE AND THE CHARACTERISTIC TOXÆMIA WHICH IS ASSOCIATED WITH THIS.

Disposing my data in accordance with the scheme thus indicated I may set forth first, adding here and there brief comment, certain data furnished by blood examinations undertaken upon rabbits inoculated intravenously with cultures of the bacillus of Welch.

##### (a) Experiments in which the Bacillus of Welch was Inoculated Intravenously into Rabbits.

#### Experiment 21.

Rabbit 5.—This was a companion rabbit to Rabbit 4 (Experiment 18), and it was inoculated intravenously with 1 c.c. of the same potato broth culture as was there employed. A comparison of the figures given below with those given in connexion with Experiment 18 shows up to the 19 hours after the injection profound differences here, the alkalinity of the blood between the two remaining practically unaffected and the antitryptic power sinking away only very slowly. Thereupon, apparently quite suddenly the rabbit became collapsed and the circulation flagged so much that blood was unobtainable from the ears (these were stone cold) and had to be drawn off from the femoral artery. Respiration was 80 to 100 in the minute, and the clinical picture corresponded to that of the classical "acid rabbit" of Walther and Stadelmann—i.e., to the clinical picture seen when a rabbit is overdosed with hydrochloric acid. The details of the experiment are as follows.

Times when the samples of blood were collected.	Measurements of antitryptic power and alkalinity.	
	Antitryptic power.	Alkalinity of blood.
Immediately before injection ... ... ...	3.6	N 30
15 minutes after injection ... ... ...	2.2	—
4 hours " " " " ...	3.0	
19 " " " " ...	2.5	N 35
21 " " " " ...	4.0	N 50
23 ½ " " " (1½ hours after death)	1.6	N 180

Owing to the difficulty of procuring sufficient rabbits only two more experiments of this kind were made. Both of these, so far as the first hours of observation are concerned, confirmed the results of Experiment 21; but neither of them gave any evidence in corroboration of the view that death in infection by the bacillus of Welch is ushered in by an acidæmia. In view, however, of the circumstance that there were in each a formidable lacuna in the observations, the animal in each case dying unexpectedly in the night, the fact that evidence of the supervention of acidæmia is wanting must be discounted. The data relating to one of the two rabbits—a rabbit that was found dead in 18 hours after the intravenous injection of a small quantum of culture—are given below.

#### Experiment 22.

Times when the samples of blood were collected.	Measurements of antitryptic power and alkalinity.	
	Antitryptic power.	Alkalinity of blood.
Immediately before injection ... ... ...	3.0	N 40
10 minutes after injection ... ... ...	2.6	N 40
30 " " " " ...	2.0	N 40
2 hours " " " " ...	2.0	N 40
6 " " " " ...	1.5	N 45

We pass now from the consideration of rapidly fatal intravenous inoculations to which there is no obvious immunising response to study the effects of subcutaneous inoculations

in the case of animals who for the most part respond and survive.

(b) *Experiments in which the Bacillus of Welch was Inoculated Subcutaneously into Guinea-pigs and White Rats.*

Here also observations were made upon the antitryptic power and the alkalinity of the serum from the circulating blood. In addition—for it was possible to do this until

CHART I.

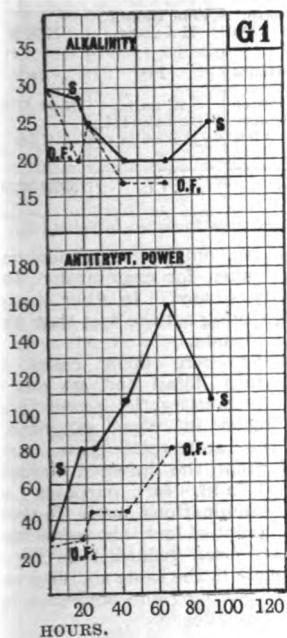


CHART II.

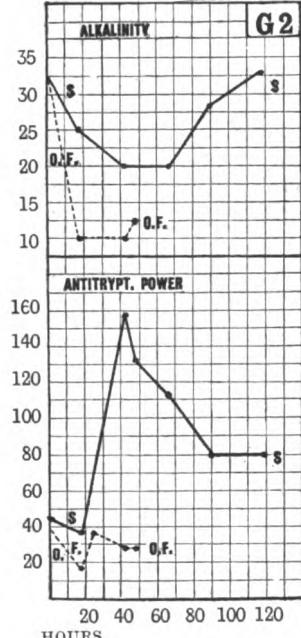
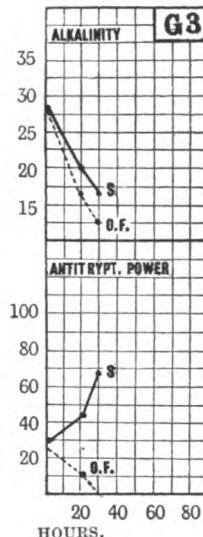


CHART III.



## Experiment 25.

Guinea-pig No. 3.—The animal was inoculated subcutaneously with 0.3 c.c. of a 24-hour-old potato-broth culture aerobically grown. Local effusion was well developed after 21 hours. After 27 hours the subcutaneous tissue, as soon as it became flaccid through withdrawal of fluid, filled up rapidly with gas, and the animal died 33 hours after the injection. (See Chart III., G 3.)

## Experiment 26.

White rat No. 1.—The animal was inoculated subcutaneously with 0.7 c.c. of a 24-hour-old potato-broth culture aerobically grown. Local effusion was well developed 16 hours after, and from the second day onwards the lesion became indurated and the oedema gradually disappeared, the animal making a perfect recovery. (See Chart IV., R 1.)

## Experiment 27.

White rat No. 2.—The animal was inoculated subcutaneously with 0.6 c.c. of a 24-hour-old potato-broth culture. The local lesion ran the same course as in the first rat, and the animal, after being very ill for two days, made a perfect recovery. (See Chart V., R 2.)

## Experiment 28.

White rat No. 3.—The animal was inoculated subcutaneously with 3/5ths of a 24-hour-old potato-broth culture. There was less effusion than in the case of the first two rats, and by the second day it had been completely absorbed. The animal was never really ill. (See Chart VI., R 3.)

It is brought out very clearly in these charts that infection by the bacillus of Welch produces as a rule both a local and a general acidosis, and it will be seen—and, of course, this was to be expected *a priori*—that we have always a more pronounced acidosis in the local lesion than in the general blood stream. Where, as in Chart III., the acidæmia becomes

CHART IV.

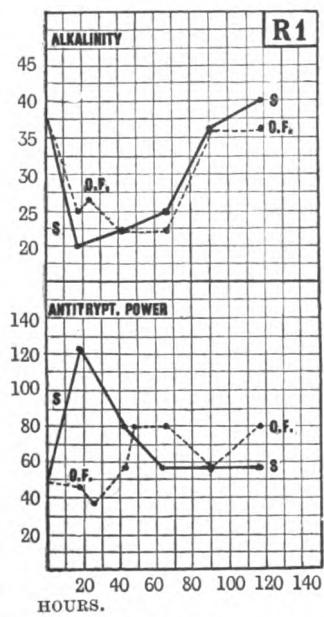


CHART V.

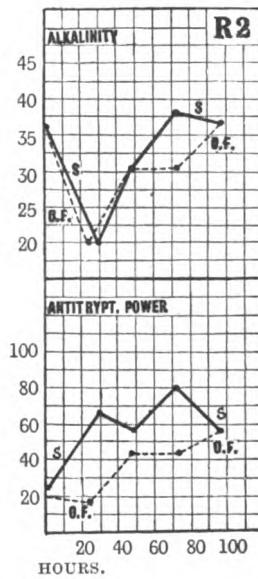
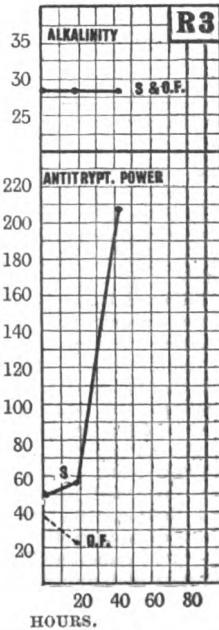


CHART VI.



such time as the local effusion was either absorbed or broke through the skin and was lost—determinations were made also of the antitryptic power and alkalinity prevailing at the seat of the inoculation. In each case the results are set out in the form of charts. Upon these the unbroken line is the curve obtained from the circulating blood; the interrupted line the curve from the oedema fluid. And in each case the scale is a scale of reciprocals—i.e., the figures are the quotients obtained by taking the dilution of the reagent which neutralised the effect of an equivalent volume of serum and dividing this into 1000.

## Experiment 23.

Guinea-pig No. 1.—The animal was inoculated subcutaneously in the leg with 0.1 c.c. of a 24-hour-old potato-broth culture aerobically grown. Beginning in the leg the effusion gradually spread over the whole of the belly, and finally after three days the skin broke down and the animal afterwards recovering and the wound healing over. The film preparations made from the effusion showed at first very numerous and afterwards only few bacilli. (See Chart I., G 1.)

## Experiment 24.

Guinea-pig No. 2.—The animal was inoculated subcutaneously with 0.3 c.c. of a 24-hour-old potato-broth culture aerobically grown. Local effusion was well developed after 18 hours; it increased in quantity up to the 48 hours and then broke through upon the skin and leaked away, the wound afterwards healing up and the guinea-pig making a good recovery. (See Chart II., G 2.)

very pronounced the animal succumbs. And where, as in Chart VI., there is no acidæmia the animal is never seriously ill. Turning to the antitryptic power, we see that in all cases without exception—and when we turn back we can see indications of this also in the rabbit experiments

(*vide* Experiments 21 and 22)—the curve which represents the antitryptic power of the blood rises. It rises very steeply where, as in Chart VI., the animal deals triumphantly with its infection; and it rises only very little where, as in Chart III., the animal puts up only a very feeble fight.

It also holds true of the curve of the antitryptic power of the oedema fluid in Charts I., II., IV., and V. that as the animal begins to recover it rises, following the curve of the blood, and we see in Chart III. that the oedema fluid may become tryptic in the case where the animal fails to stand up against the infection.

(c) *Observations Made on Man.*

We have now by experiments conducted *in vitro*, and in the dead, and living animals, collected sufficient data to enable us to construe aright such observations as it may be practicable to make upon men suffering from wounds infected by the bacillus of Welch, or from that spreading tissue infection which is spoken of as "gas gangrene," or again from that sharply characterised toxæmic condition which is the ultimate outcome of that infection.

A commencement may be made by setting out in tabular form the results of a series of antitryptic measurements made by me on three consecutive days in a casualty clearing station. These results relate to men all recently admitted to hospital with severe and highly infected wounds—cases of manifest "gas gangrene" being here specially excluded. I may further explain that many of the cases who were examined on the first day were examined also on the second, and similarly many of the cases examined on the second were re-examined on the third day. (See Table I.)

TABLE I.—*Measurements of the Antitryptic Power of the Blood of Normal Men, Slightly Wounded Men, and Heavily Wounded Men, excluding those affected with "Gas Gangrene."*

Date.	Normal men.		Slightly wounded men.		Heavily wounded men, excluding cases of gas gangrene.	
	A.T.P. of the individual men.	Aver-age.	A.T.P. of the individual men.	Aver-age.	A.T.P. of the individual men.	Aver-age.
5:1:16	4·4 4·4	4·4 units	5·7 3·6 4·4 4·4 11·4 4·4 4·4	5·5 11·4 8·0 4·4 11·4	11·4 8·0 11·4 8·0 4·4 11·4 5·7 6·6	8·5 units
6:1:16	5·7 4·4	5·0 units	5·7 5·7 5·7 5·7 5·7	5·4 units	11·4 10·0 16·0 16·0 11·4 5·7 5·7	10·9 units
7:1:16	4·4 5·0	4·7 units	8·8 4·4 4·4 5·7 5·7 8·0	6·3 units	22·2 11·4 18·1 18·1 11·4 13·3 18·1	16·1 units
Summary ...	...	4·7 units	—	5·8 units	—	11·3 units
Antitryptic index ...	1		1·23		2·4	

It is brought into clear view by the summary that—and I have already on previous occasions emphasised this point—every microbic infection of wounds (and the same probably holds of all microbic infections and inoculations of vaccine) is followed by a rise in the antitryptic power constituting a non-specific immunising response—that response being greater or less in accordance with the degree of the severity of the infection. Moreover, consideration of the figures for the successive days indicates that as the septic condition develops the antitryptic power gradually increases. I next take from the foregoing table its data relating to the antitryptic power in heavily infected patients not affected with "gas gangrene," supplement these with data furnished by measurements of their blood alkalinity; and then contrast these with data furnished by measurements of antitryptic power and blood alkalinity carried out on "gas gangrene" patients, adding also for comparison figures which apply to normal men.

These data are incorporated in Table II.

Scrutiny of this table reveals that there is with regard to antitryptic power absolutely no difference between heavily infected patients not suffering from "gas gangrene" and patients suffering from that infection. When, however, we turn to the column headed "Blood alkalinity," we see that while the blood alkalinity of the heavily infected patient corresponds exactly with the normal, in the "gas

TABLE II.—*Summary of Measurements of Antitryptic Power and Blood Alkalinity made upon Heavily Infected Patients not affected with "Gas Gangrene," and "Gas Gangrene" Patients respectively.*

	Antitryptic power.	Blood alkalinity.
Heavily infected patients exclusive of cases of spreading gas gangrene bacillus infection.	25 Number of patients examined. Range of variation within the group. Average for the group.	10 5·7-22·2 units. (Vide Table I.) 11·3 units. N/30-N/35 N/31·5
Patients suffering from spreading gas gangrene bacillus infection and intoxication.	14* Number of patients examined. Range of variation within the group. Average for the group.	15* 5-22 units. (Vide Table III.) 11·2 units. N/40-N/80 N/55
Normal men	4·7	N/30-N/35

\* The majority of these patients are those included in Table III.

"gas gangrene" patient, and, of course, only quite pronounced cases of "gas gangrene" were taken for examination, the blood alkalinity is very markedly reduced. In other words, the figures here brought together bring out the fact that the toxæmia of gas gangrene is an acidæmia.

In Table III., concentrating here upon cases of "gas gangrene," I go more into detail and set out a series of measurements of the antitryptic power and alkalinity of the circulating blood in "gas gangrene" and also measurements of the antitryptic power and alkalinity of lymph obtained from the infected tissues. At the end of the table I add, for purposes of comparison the details of the examinations made in two cases which might—though, in point of fact, the error was in neither case committed—have been regarded as "gas gangrene" cases. I further include in the table six observations bearing on the treatment of gas gangrene acidæmia by the intravenous administration of alkalies.

*Data Furnished by Measurements of the Antitryptic Power and Alkalinity of the Circulating Blood and of the Lymph from the Infected Tissues in Cases of "Gas Gangrene."*

Consideration of the data which are set out in Table III. makes, as I think, quite clear that we are, in the so-called "gas gangrene infection" of man, dealing with essentially the same phenomena as in our laboratory experiments. We saw in *in vitro* cultures in serum that the bacillus of Welch diminishes the antitryptic power of the medium and renders it acid; and we saw that the serum is by these means converted into a pre-eminently favourable medium for the growth of the bacillus. In experiments on the blood in the dead body we saw that it is these chemical changes which furnish the conditions required for the avalanche-like inroad of the bacterial infection. And, finally, experiments upon living animals showed that we have in infections by the bacillus of Welch, *with respect to alkalinity*, a reduction in the fluids taken from the focus of infection, and also a reduction in the circulating blood; and, *with respect to antitryptic power*, in the circulating blood, a marked immunising response, while we have in the infected tissues a diminished or abolished antitryptic power, especially where the animal is only unsuccessfully combating or succumbing to the infection.

Every one of these points obtrudes itself again upon our notice in the records dealing with human "gas gangrene" which are brought together in Tables II. and III. We have there, to begin with, the high antitryptic response in the circulating blood and the reduced or abolished antitryptic power in the infected tissues or infected effusions. We have, in addition, diminished alkalinity in the infected tissues or infected effusions. And we have not only a local acidosis, but we have also an acidæmia. We find that acidæmia where the infection has culminated in that "gas gangrene toxæmia" which is ushered in by vomiting and then shows itself in collapse, with rapid respiration, ashy-grey pallor, feeble and then impalpable pulse, the body becoming stone-cold before death, first the hands and feet, then the whole limbs, finally the nose, ears, and forehead, the patient remaining with clear intellect and without suffering to the last.

It may perhaps, pending further investigation, be assumed with respect to this acidæmic condition that the acid production proceeds not only in the infected tissues standing in

TABLE III.

Serial number	Brief outline of the case.	Data with regard to the antitryptic power and alkalinity of the blood.	Data with regard to the antitryptic power and alkalinity of the lymph in the infected tissues.
1	Spreading gangrene bacillus invasion in subcutaneous tissue of arm, with coppery discolouration and crepitus. Amputation of arm.	A.T.P., 8 units.	Edema fluid from tissues close to the wound : Tryptic. Edema fluid from spreading edge : A.T.P., 2. (Edema fluid from tissues above the wound : A.T.P., 1.6.)
2	Clinical features as in Case 1.	A.T.P., 6.6 units.	Before intravenous injection : Alkalinity, N/80; A.T.P., 6.6 units. 10 minutes after injection : Alkalinity, N/50; A.T.P., 6.6 units.
3	Multiple shrapnel wounds of leg with spreading gangrene bacillus infection in subcutaneous tissue. Acute toxæmia, with rapid respiration, impalpable pulse, and cold creeping upwards from extremities. Intravenous injection of 16 grammes of NaHCO <sub>3</sub> . Death 12 hours after onset of toxæmic symptoms.	A.T.P., 11.4 units. Alkalinity, N/50.	Fluid from knee : A.T.P., 2 units; Alkalinity, N/50. Fluid from subcutaneous tissue : A.T.P., 3.3 units; Alkalinity, N/40.
4	Extensive wound of thigh. Spreading gangrene bacillus infection involving knee and spreading in subcutaneous tissue of the thigh with crepitus. Amputation of thigh. Death 48 hours after operation.	—	—
5	Compound fracture of thigh with extensive flesh wound. Rapidly spreading gangrene bacillus infection of tissues. Acute toxæmia. Icteric serum*; culture of the bacillus of Welch from blood 4 hours, intravenous injection of 8 grammes of NaHCO <sub>3</sub> 8 hours, and death 14 hours, after onset of toxæmic symptoms.	Before intravenous injection : A.T.P., 5 units; Alkalinity, N/50. 5 minutes after injection : A.T.P., 5 units; Alkalinity, N/50. 6 hours after injection : A.T.P., 5 units; Alkalinity, N/50.	—
6	Compound fracture of ankle. Acute toxæmia with collapse, precluding operation. Injection of 20 grammes of lactate of soda. Condition rapidly improved and amputation carried out. In evening patient was sitting up, next morning general condition very satisfactory, and patient made a good recovery.	Before injection : Alkalinity, N/50. Immediately after : Alkalinity, N/50. 7 hours after : Alkalinity, N/50. Next morning : Alkalinity, N/40	—
7	Extensive wound in upper third of arm. Gangrene with dark livid discolouration and hemorrhagic blisters, with purple mottling extending over the shoulder. Profound toxæmia; 10 grammes of NaHCO <sub>3</sub> intravenously. Disarticulation at shoulder. Next morning general condition satisfactory and patient made a good recovery. Very numerous shrapnel wounds of both legs. Gangrene bacillus infection spreading out from these in the form of infiltrated copper-coloured patches.	At time of operation : Alkalinity, N/70. 6 hours after : Alkalinity, N/60. Next day : Alkalinity, N/40.	Edema fluid from upper arm : Alkalinity, N/200. (Edema fluid from lower arm : Alkalinity, N/60.)
8	Gangrene of leg spreading upwards. Amputation at middle of thigh.	A.T.P., 20 units; Alkalinity, N/50.	Edema fluid from infiltrated copper-coloured patches : A.T.P., 6.6 units; Alkalinity, N/60.
9	Massive gangrene infection of all muscles of anterior aspect of thigh.	A.T.P., 8 units.	A.T.P. of edema fluid from spreading edge, 2.9 units.
10	Hemothorax infected with Welch's bacillus and containing many W.B.C. Icteric serum.	Alkalinity, N/60.	Clear fluid from wound : Alkalinity, N/60. Pleural effusion : A.T.P., 6.6 units; Alkalinity, N/100.
11	Hemothorax film preparations show 20 or more R. Welch in each microscopic field. No indications of growth in effusion when cultured, and growth on artificial media only when very large quanta are implanted.	A.T.P., 22 units; Alkalinity, N/40.	A.T.P., 8 units; Alkalinity, N/100.

TABLE III.—(Continued).

Serial number	Brief outline of the case.	Data with regard to the antitryptic power and alkalinity of the blood.	Data with regard to the antitryptic power and alkalinity of the lymph in the infected tissues.
13	Patient admitted with an enormous wound in groin and in a condition of collapse. Recovered sufficiently to allow of incomplete operation. 24 hours later vomiting and very feeble, rapid pulse. Intravenous injection of 20 grammes of NaHCO <sub>3</sub> . Next day some improvement. Day after patient succumbed.	Alkalinity, N/40 of blood collected circ. 18 hours after operation.	—
14	Amputation after 4 days in hospital of thigh for gas gangrene starting from wound of leg and knee. 24 hours after patient was still very weak. 40 hours after operation 10 grammes of NaHCO <sub>3</sub> intravenously. Patient succumbed 24 hours later.	Blood taken at time of operation : A.T.P., 16 units; Alkalinity, N/60. Blood taken 24 hours after operation : A.T.P., 20 units; Alkalinity, N/60. Blood taken immediately before injection : A.T.P., 20 units; Alkalinity, N/50. Blood taken immediately after injection : A.T.P., 23 units; Alkalinity, N/40.	Fluid from edematous subcutaneous tissue just above level of amputation : A.T.P., 13.3 units; Alkalinity, N/80.
15	Amputation stump of upper part of thigh with gas infection of the sloughing surface. An axial incision carried up from this upon ilium. (Edema fluid neutralised by lactic acid gives anaerobically in 4 hours a foaming culture of R. Welch. Unneutralised it gives anaerobically a scanty growth in 18 hours. Heart blood obtained 24 hours later at P.M. gives a pure culture of streptococcus.	A.T.P., 16 units; Alkalinity, N/35.	Edema fluid intermixed with blood from incised tissue : A.T.P., 16 units; Alkalinity, N/35.
16	Perforating wound immediately below the knee. Limb cold and edematous. Amputation with view to possibility of gas gangrene infection.	A.T.P., 8 units; Alkalinity, N/35.	A.T.P., 4.4 units; Alkalinity, N/35.

\* The special features of the blood in gas gangrene toxæmia are that the serum is of a characteristic deep yellow colour, there being also, as in most cases of serious bacterial intoxication, a very heavy buffy coat.

relation with the wound, but also in the liver and other internal organs to which the bacillus of Welch may have been conveyed—metastatic growth being favoured as soon as the alkalinity of the blood begins to be reduced by the influx of lymph charged with acid in the infected tissues.

Considerations of this kind should be present to our minds when we turn to take stock of the results of the therapeutic administration of alkalis in "gas gangrene." As shown by the records, this procedure gave markedly favourable results only in two cases out of the six. In those two cases, however, the effect was dramatic. Probably in the other cases, as is the case in the acidæmia of diabetes and uræmia, the evolution of acid must have gone on unaffected.

It must be left for future experimentation to determine whether better results can be obtained by earlier intravenous injection of alkali, and whether the local evolution of gas gangrene could be arrested by the injection into the tissues or, as the case may be, into an infected hæmorthorax of alkali or of an alkalinised strongly antitryptic serum, remembering here that a strongly antitryptic serum can practically always be obtained either from the patient himself or from any other heavily infected patient.

In concluding, I have to express my acknowledgments to my colleague Major Georges Dreyer for generous assistance in plotting out the curves and in some of the experiments; to my fellow worker the late Captain H. H. Tanner for similar assistance. My thanks are also due to Captain Haycraft for help in connexion with the study of cases of gas gangrene, and to my fellow worker Dr. Alexander Fleming for permission to incorporate in this lecture some of the results of his research work.

## ORTHOPÆDIC METHODS IN MILITARY SURGERY.<sup>1</sup>

BY D. McCRAE AITKEN, M.B., CH.B. EDIN., F.R.C.S.

LET me first express to you my appreciation of the honour of giving a demonstration of orthopaedic methods in military surgery before this distinguished society. I fear that there must be some lack of continuity in the arrangement of my remarks. In selecting cases for demonstration, I have been guided first of all by the material available in my wards at the Military Orthopaedic Hospital. I regret that I have neglected to keep photographic records of many cases which would have been interesting. The consideration, however, which has been most prominent in my mind, is that at no time in the history of this country has conservative surgery been a matter of such vital economic importance.

I have, therefore, selected cases by which I hope to prove that with patient perseverance in gentle methods it is possible to arrive at restoration of function which would be impossible by any violent means of attack, or any direct operative procedure however brilliantly designed. In orthopaedic surgery operation is always a mere preliminary to clear the way for educative treatment to restore function; it is not a direct curative measure.

### *Injuries of the Shoulder.*

The first series of cases illustrates the conservation of the deltoid muscle after injury, and the restoration of its function where lost from disuse following severe injury. The line of treatment follows that employed in cases of poliomyelitis or in fracture-dislocation of the shoulder, the guiding principle being that in all serious lesions about the shoulder the abducted position of the arm is a safe position for treatment, though not always the easiest to maintain. For example, we have long known that a shoulder ankylosed with the arm by the side leads to a very useless limb, while if ankylosed with arm abducted, in such a position that with the elbow flexed the fingers come easily to the mouth, the mobility of the scapula is developed so as to make up for the loss of the shoulder-joint. Thus, after ankylosis of the shoulder we have been in the habit of performing a cuneiform osteotomy of the humerus and abducting the arm so as to secure union in the abducted position.

In children full abduction is permissible, for in two or three years they develop an extraordinary compensatory mobility of the scapula. In adults the arm should be raised to rather less than a right angle, otherwise the elbow may not come quite down to the side when the scapula is dropped, and the patient goes about as if he were offering his arm to a partner for dinner, which might be embarrassing.

CASE 1.—I regret that I have no photographs before treatment was commenced. Nov. 19th, 1915: Gunshot wound of right shoulder; suppuration, removal of head of humerus. April 11th, 1916: Admitted five months after injury. No voluntary abduction; wounds not quite healed; scar in muscles firmly adherent to subjacent bone. Passive abduction only 45° without pain. April 19th: Gradual abduction; on abduction splint. (Fig. 1.) July 1st: Lifts arm off splint. (Fig. 2.) August 30th: Discharged; able to put hand to his back collar-stud and brush his hair.

CASE 2.—Sept. 8th, 1916: Fractured scapula, &c. Fracture through spine and body of scapula, septic, patient ill, shoulder dropped. Fractured ends of bone exposed and bare; wound a large round gap. Sept. 18th: Admitted. Elbow supported. Pain relieved by lifting arm and shoulder on abduction pillow in the axilla; at same time gap in scapula closed and bones which were exposed have granulated over. (Photograph shown.) Sept. 22nd: Haemorrhage. Sept. 23rd: Abduction splint applied (Fig. 3), as it was now more easy to abduct the arm, and the wound was more healthy under irrigation and frequent dressing with hypochlorite lotion.

CASE 3.—April 26th, 1915: Wound of left shoulder. Three operations. Head of humerus removed August 23rd, 1915, as shown in X ray plate. (Fig. 4, skiagram.) June, 1916: Admitted. Put on abduction splint. August 23rd: Can lift arm off splint, but posterior part of deltoid overpowers anterior part. (Fig. 5.) I am trying to devise a light apparatus to hold the butt of the humerus more steadily against the remains of the scapula, so that a fairly efficient false

joint may result. As you see in the cast, the upper end of the humerus falls too low in the axilla when the muscles are relaxed.

CASE 4.—August 15th, 1915: Dardanelles. Two operations to remove bone, as shown in X ray. June 22nd, 1916: Admitted. Abduction splint. July 30th: Signs of recovery in deltoid. August 14th: Subperiosteal abscess in upper part of humerus opened and muscle recovery all abolished. (Photograph and patient shown.) This patient is now being kept in the splint to await the results of this inflammatory attack, and I am not curious to know whether he can move the shoulder or not, for even if it result in ankylosis his position is a good one. If I were to move his shoulder before voluntary movement returns I should only do harm.

CASE 5.—Feb. 1st, 1916: Gunshot wound of right shoulder. Sept. 15th: Admitted. No voluntary power in deltoid, as is manifest from the flattened appearance of the shoulder. (Figs. 6 and 7.) Put on abduction splint. (Fig. 8.) You will now see the muscle twitches returning, if you look carefully, when the patient makes a voluntary effort to raise the arm. This returning power is being carefully encouraged by massage, but he is never allowed to lower his elbow, which would stretch the weak muscle and probably paralyse it again by over-stretching it.

### *Injuries about the Elbow-joint.*

Passing next to the elbow-joint, I am tempted to digress first in a little personal history. In 1897-98, when a dresser in the surgical wards in Edinburgh, I was taught that every injury about the elbow, except fracture of the olecranon, should be treated in the fully flexed position. This doctrine had, I believe, been introduced by Caird and Cathcart, who had brought it from Liverpool. The second part of the Liverpool teaching, however, had escaped the Edinburgh teachers, and I look back with horror on the industry with which I performed daily passive movements on an unfortunate child with a split fracture of the condyles of the humerus, with the inevitable result that the joint became more painful and more stiff.

Three years later, when I became house surgeon to Robert Jones in Liverpool, I was taught the doctrine of rest. That is, that having flexed an injured elbow it must be left alone for three weeks or more, till all tenderness about the joint has disappeared. Then, and not till then, the sling may be slackened a few inches; if, two days later, the patient can move the hand through those few inches, the sling may be further slackened. If, however, the elbow become stiff in the new position, it must be again flexed and left to rest for another week or more before again testing it for mobility.

When in 1907 I walked round London hospitals, when I was a candidate for the Fellowship examination, I was surprised, and may I say horrified, to find that the internal right-angled splint was still being recommended for injuries of the elbow. I am still more horrified to find it in use to-day. I know of no injury about the elbow in which the internal right-angled splint can be regarded as a proper splint.

For this strong and sweeping statement there are two good reasons. The first is that the prominent internal epicondyle is pushed outwards, and the line of the elbow-joint distorted if the fracture is through or above the condyles; the second is that even if the epicondyle be to some extent accommodated in a hole in the splint, the forearm is fixed half way between supination and pronation, with the palm of the hand against the splint.

I would lay it down as a standing rule that in all injuries of the arm and elbow, and most of the forearm, the forearm must be supinated and the palm of the hand must be directed towards the face. If this is neglected there will be an error in the carrying angle of the elbow, or there will be limitation of the supination in the forearm, a very serious disability of which we have dozens of examples sent to us in the Military Orthopaedic Hospital. I know it is not always easy or possible to attain this, but I am certain that many surgeons are not consciously and deliberately trying to secure full supination in the early stages of treatment.

The next case I show is one of compound fracture immediately above the condyles.

CASE 6.—Sept. 3rd, 1916: Somme; salt pack, No. 5 Rouen. Sept. 18th: Admitted. Wounds pouring pus, and bare bone ends visible. Put on humerus extension splint for irrigation and dressing with hypochlorite solution. Oct. 8th: Wounds granulating, and looking cleaner. Rearranged under anaesthetic and put in flexed position with forearm supinated, and

<sup>1</sup> Demonstration of cases before the Medical Society of London, Oct. 23rd, 1916.

FIG. 1.



FIG. 2.

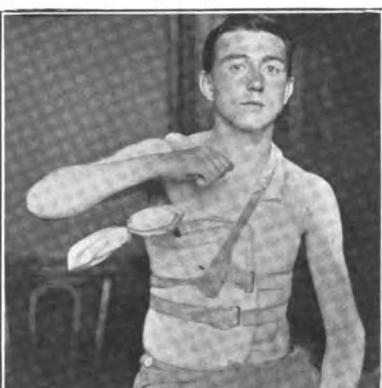


FIG. 3.



FIG. 4.



FIG. 5.



FIG. 6.



FIG. 7.

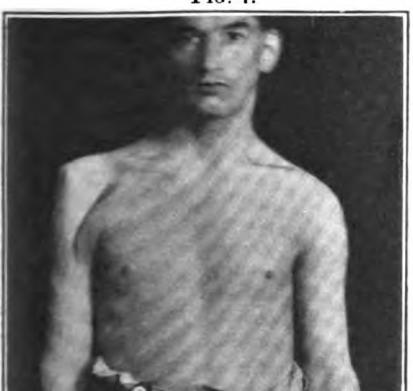


FIG. 8.



FIG. 9.

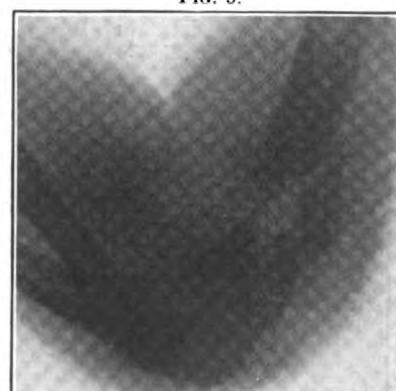


FIG. 10.

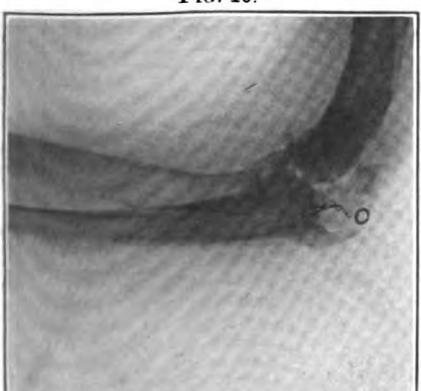


FIG. 11.

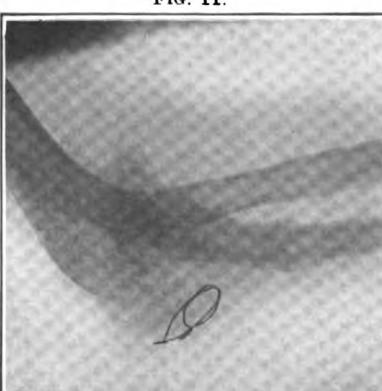


FIG. 12.

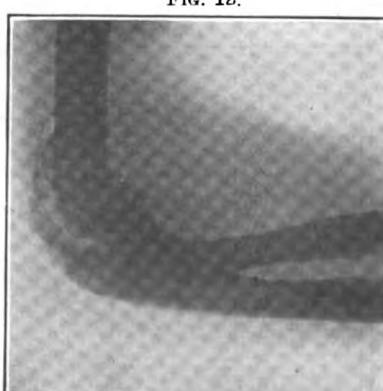


FIG. 13.

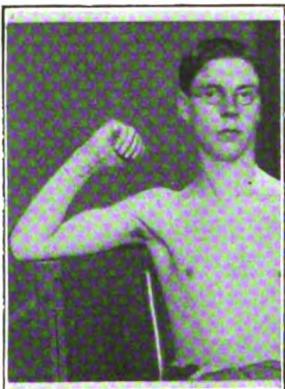


FIG. 14.

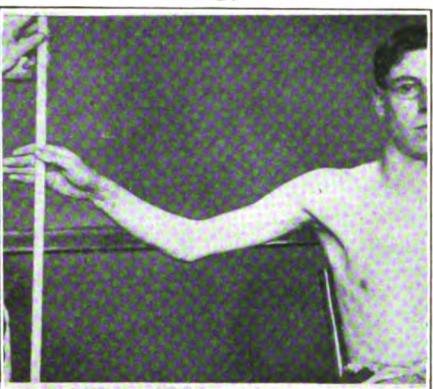


FIG. 15.

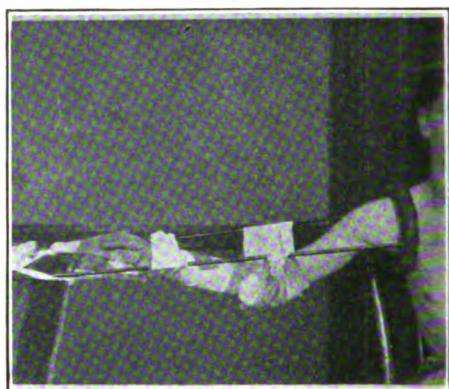


FIG. 16.

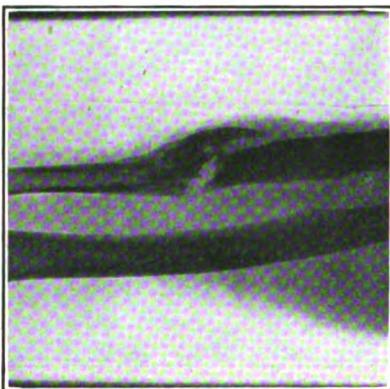


FIG. 18.

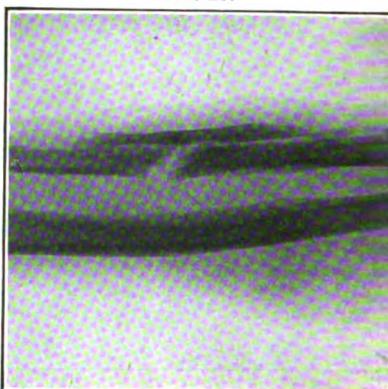


FIG. 19.

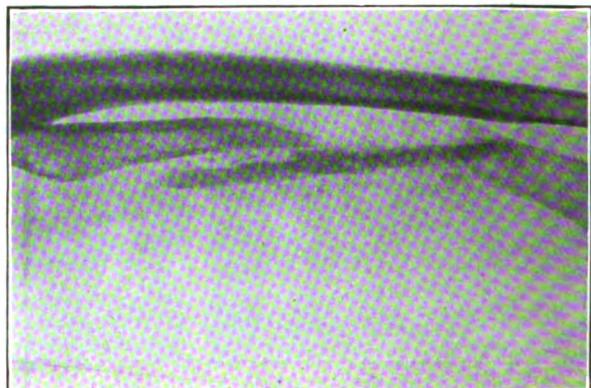
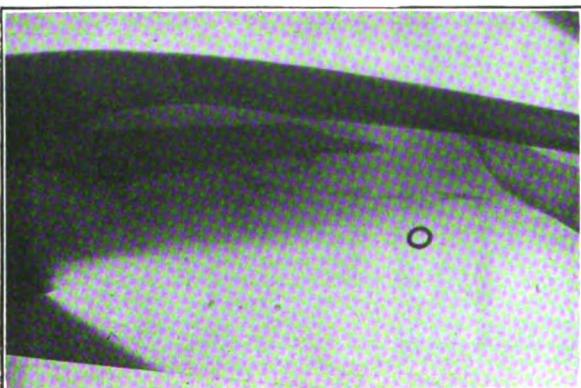


FIG. 21.



FIG. 22.



FIG. 23.



FIG. 24.

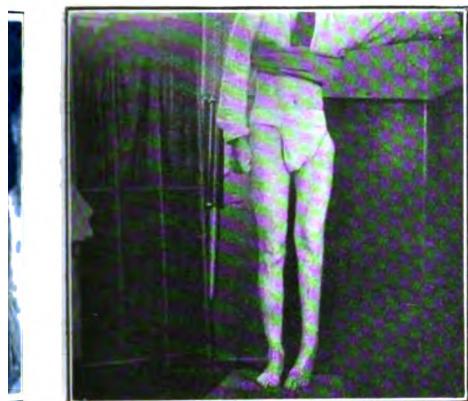


FIG. 25.



FIG. 26.



FIG. 27.



FIG. 28.

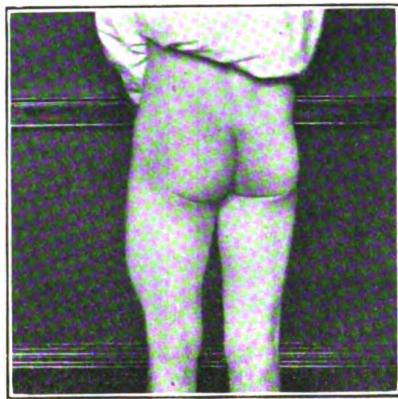


FIG. 29.



FIG. 30.

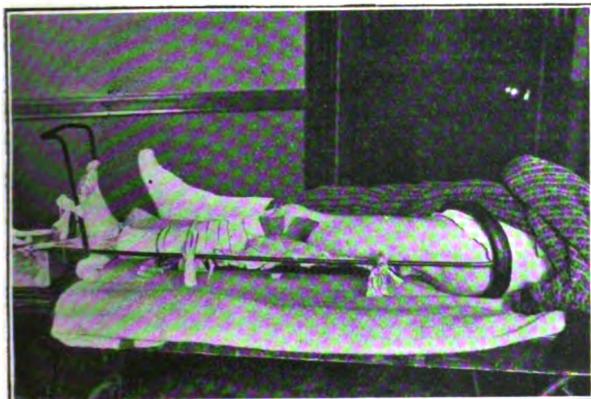


FIG. 31.

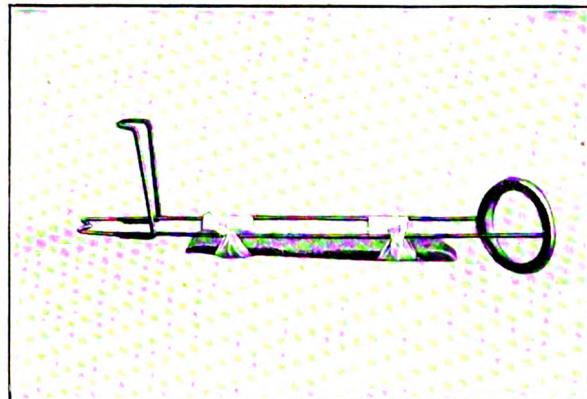


FIG. 32.

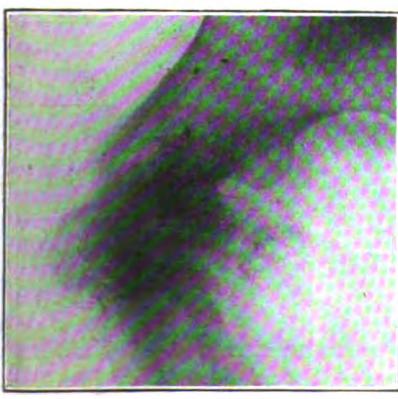


FIG. 33.



FIG. 34.



FIG. 35.



FIG. 36.



FIG. 37.



FIG. 38.

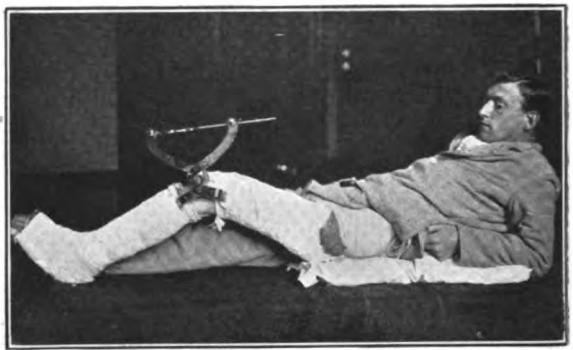


FIG. 39.

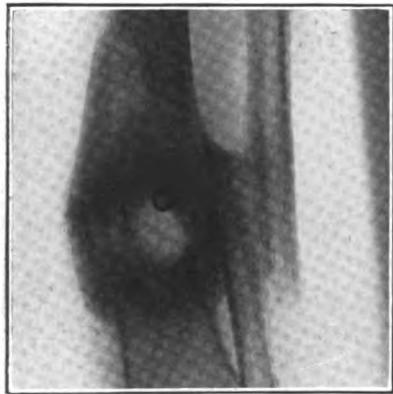


FIG. 40.

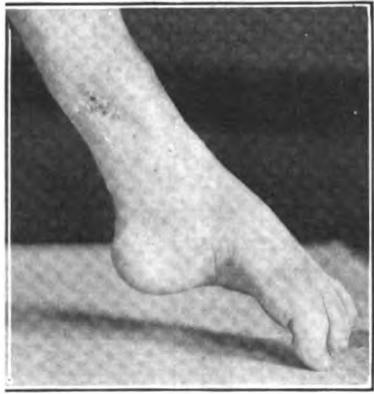


FIG. 41.



FIG. 42.



FIG. 43.



FIG. 44.



FIG. 45.



wrist slung as he is now (patient shown); next day the X ray you see was taken. (Fig. 9.)

CASE 7.—August 17th, 1915: Gallipoli; operation to remove bone. Later wired; elbow stiff on admission just beyond right angle. May 1st, 1916: Admitted. (Fig. 10.) Wire felt at bottom of sinus and pulled out one day in June when it was loose. July 20th: Sinus healed. The X ray shows the apparently hopeless destruction of the joint. Short sling with rotation turn to supinate forearm. Movement returning as you see (patient shown). One Saturday I got a note from Dr. Mennell, who is in charge of the Massage Department, that he thought we were going too fast with movement, as the range was decreasing; he will therefore have a further period of rest in a short sling.

CASE 8.—Motor-cycle accident. I merely show this case as an example of the conundrums one may have to deal with. Meantime the patient has fallen and broken something loose, and I am having the arm extended in the hopes of reducing subsequent difficulties. The X ray shows the olecranon in position and the coronoid dislocated in front of the humerus, with a fracture of the shaft about 2 inches lower down, which makes manipulation of the upper end practically impossible. (Fig. 11.)

CASE 9.—March, 1916: Shrapnel entered above internal condyle; removed back of elbow. On admission could flex to 45°, extend to 120°. (Figs. 12, 13, and 14.) Has been fully extended once, then flexed for fear of stiffness. The elbow is now being definitely extended, as full flexion was recovered without difficulty after the first gradual extension. The picture shows the method of straightening an elbow (Fig. 15) in a straight Thomas arm-splint. In the patient who is now before you note that in one week, since the photograph was taken, the arm has become quite straight.

#### *Cases Illustrating Points in Treatment.*

The next series of cases I am showing because in each I made an error of judgment or in technique. I have learned from them and others may learn also.

CASE 10.—August 10th, 1915: Dardanelles. Developed typhoid 10 days after arrival in England. June 13th, 1916: Admitted with malposition and non-union shown in the picture. (Fig. 16.) Wounds had been healed only three months. As I did not intend to do an open operation, I thought I might risk reducing the deformity. June 26th: Straightened arm manually under anaesthetic. June 28th: Arm swollen, bullæ, wounds broken down and there was profuse discharge of pus. Now ulna united and line straight. Several small sequestra have come away.

CASE 11.—Oct. 13th, 1915: Bullet fractured right ulna. August 1st, 1916: Admitted bone ununited. (Fig. 17.) August 7th: Lateral graft from tibia; broke graft in getting it out, therefore shorter than was planned, as seen in the second X ray. (Fig. 18.) A broad osteotome is essential for picking out graft. The blade should be 2 inches broad. At the time the broadest osteotome available was only 1 inch, hence the accident. Oct. 10th: United: exercise. Now you see the nature of the movements possible. (Patient shown.)

CASE 12.—August 15th, 1915: Dardanelles. Gunshot wound of left arm. Operation at base; later operation to remove dead bone. June 1st, 1916: Admitted. Wounds healed. Defect in radius, as shown in X ray (Fig. 19), of about 3 inches of the shaft. June 19th: Graft from tibia; lower end inserted into marrow cavity, which was a mistake. It should have been inlaid along the lower fragment down to the styloid process. At the time of operation the alignment was good. The way in which the medullary bone has yielded is visible in the X ray (Fig. 20), giving rise to distortion and delay in union. The man can, however, use the hand and movements are improving every week. The flexor of the thumb, which had no origin before operation, is now acting, having taken a new origin from the grafted radius.

#### *Injuries of the Wrist.*

At the wrist in most instances stiffness in a flexed position is the fault to be avoided, and dorsiflexion is the first preliminary to any treatment. It is no use wasting time on massage till the wrist has been dorsiflexed. Every school-boy knows that the grip of the hand is weakest with the wrist flexed.

CASE 13.—Jan. 28th, 1916: fracture of right leg; shrapnel wound of left leg; compound fracture of wrist. On admission wrist flexed; could barely move fingers. Injury, fracture of lower end of radius and carpus. Supination very limited. (Photograph and X ray shown.) Oct. 15th: Anaesthetic; wrenched into dorsiflexion with Thomas wrench and put into plaster. Can now move fingers better than before. (Patient shown.)

While the epidiascope is being got ready I shall demonstrate the use of wrench on a wrist.

CASE 14.—Wounded May 3rd, 1915, Cameroons. X rays: (1) at base (Fig. 21), June, 1915; (2) (Fig. 22), August, 1915; (3) (Fig. 23), August, 1916. The treatment was exactly the same, wrenched three weeks ago yesterday. You now see how he can move his fingers independently after three weeks. Before the wrist was dorsiflexed he could barely move them all together at the interphalangeal joints and had no independent movement of individual fingers. The question of making a false joint at the base of the thumb is deferred till the present treatment is completed.

#### *Injuries to the Lower Limb.*

In the lower limb the problem of restoration of function is often much more simple than in the upper limb. If a man has a disability which precludes walking any arrangement which makes him independent of crutches is a boon. In my cripple hospital for children I do not think you will find a single pair of crutches. The reason for this is that if a child is allowed to swing along on crutches he will not bother about learning to use his limb properly. The same is in large measure true of the soldier. Unfortunately the hospitals are over-supplied with crutches. It is very difficult to prevent a man from getting hold of them; if he has not crutches of his own he borrows them, and then he does not educate his defective limb as he should.

CASE 15.—Patient came into hospital having had the head of his femur destroyed and removed in 1915. The shaft of the femur telescoped up and down nearly 4 inches and he could only walk on crutches. He was sent out in a walking calliper.

CASE 16.—May 2nd, 1915: Mesopotamia; bullet wound fracture of thigh between the two trochanters. March 16th, 1916: Sciatic nerve explored in New Zealand; Mr. Herbert reported that he could not find any trace of the nerve for several inches. July 20th: Admitted, 14 months after he was wounded. Hip coxa vara deformity shown in X ray and shortening 3½ inches. (Fig. 25.) Foot in equinus position (Fig. 24); complete sciatic palsy. July 24th: Foot wrenched into right-angled position; subcutaneous division of plantar fascia. August 7th: Osteotomy of femur; extension or abduction splint. (Shown in the paintings.) Oct. 6th: Real shortening about 1 inch; put in plaster. Will soon get up in walking calliper. I have been afraid to trust body weight on the union yet, as the second X ray (Fig. 26) shows there is still a lot of consolidation of bone-tissue to take place. Note the correction of the coxa vara.

CASE 17.—Feb. 15th, 1916: Mesopotamia; bullet wound; fracture in middle of shaft of femur; healed in three weeks. Sept. 5th: Admitted; shortening 2½ inches. (Fig. 27.) Angling both lateral and antero-posterior, as shown in pictures and X ray. (Figs. 28 and 29.) Sept. 8th: Operation; disunion of the callus with chisel; extension on Thomas knee-splint. (Figs. 30 and 31.) Oct. 23rd: Up in walking calliper; shortening ½ inch. Note that there is still an overlap. The shortening found on measurement was due more to faulty alignment than to overlapping of fragments.

CASE 18.—August 23rd, 1915: Thigh shattered below trochanters. August 22nd, 1916: Admitted with malunion shown in pictures. (Figs. 32 and 33.) Sinus only healed three days. Sent out in a walking Thomas splint (Fig. 34) for six months before I dare perform the obvious operation to bring the two parts of the bone in line. By rough measurement there should be less than 1 inch of shortening after operation.

CASE 19.—April 21st, 1916: Bullet through upper part of suprapatellar pouch; no history of fracture sent with the case. May 4th, admitted 13 days later, on a back splint: knee full of fluid. X ray, taken as a precaution before starting movement, showed the fracture. This, of course, made us postpone active walking and movement. (Picture shown.) Note it is a subperiosteal fracture, presumably produced by the expansion thrust of the bullet as it passed. It did not hit the bone.

The next case illustrates the use of the Thomas walking calliper in a case of fibrous ankylosis of the knee in which, although the knee was stiff, there was pain from straining of the fibrous union.

CASE 20.—January, 1915: Bullet entered the back of lower part of thigh; exit through upper part of knee in front. May 20th, 1916: Admitted 16 months after injury. (Fig. 35.) Complete fibrous ankylosis; slight valgus deformity; pain on walking indicated that the fibrous union was being strained. Sent out in walking calliper. (Fig. 36.) To report in six months, when I am quite prepared to find that with a complete relief from all strain the fibrous union has relaxed and a small amount of movement may be present. If that

is the case, I shall then try to increase the range of movement, but the presence of pain indicates that attempts at increasing movement now will only irritate the fibrous tissue and lead to the formation of more dense deposits.

*Turner extension splint.*—The next two pictures illustrate the use of the Turner extension splint for extending stiff flexed knees. It is of value in cases where the stiffness is due to fibrous deposits in and about the joint and in the muscles. It is therefore particularly applicable in cases where there has been diffuse fibrosis, the result of long-continued sepsis of low intensity. (Figs. 37 and 38.)

*Flexion splint.*—The next splint I show is one useful for flexing stiff knees where there has been fracture of the femur, and the vasti and rectus muscles are all matted together and to the bone in one solid mass of fibrous infiltration. The splint is applied and the limb very slowly flexed for some days. Then the splint is removed and the limb allowed to straighten. Then the process is repeated, each time carrying the flexion about 5 to 10 degrees farther than the former; and so on for three to five months, when gradually some regeneration of muscle occurs as the cicatricial tissue gets loosened. After this, massage and exercise carry the process farther. The advantage over the McIntyre, from which it is copied, is that the patient can get about in the splint. It is only applicable to old cases with dense fibrosis, and is not intended for recent cases which are amenable to treatment by massage.

The next cases are a series of deformities of the leg resulting from malunion of fractures.

CASE 21.—Sept. 24th, 1915: Fracture of both bones of left leg; many pieces of bone removed. June 7th, 1916: Admitted; wound not healed; foot in extreme position of claw foot and toes also flexed. (Figs. 39 and 40.) June: Foot wrenched into right-angled position and put in plaster. Fig. 41 shows the result. Fracture too firm to yield and too septic to be forcibly dealt with. Oct. 9th: Sequestra removed from the bone.

CASE 22.—July, 1915: Buried in trench by high-explosive shell; multiple fracture of left leg; foot crushed. August 30th: Admitted; leg too straight, does not show the natural bow of the tibia; is therefore a valgoid deformity. Foot had a ridge across the dorsum due to displacement of the bases of the metatarsals. (Pictures and cast shown.) These deformities are well shown in the picture and X ray and cast. August 31st: Foot wrenched to correct displacement of tarsus and metatarsus; put in plaster. Oct. 6th, 1916: Plaster removed; shape of foot much improved, but not perfect; wrenched again; put in plaster, which you now see on the patient and in the picture before you. Note the shape of the foot. There is no evidence of the hump in the plaster.

The next two cases illustrate the method of dealing with the troublesome deformities arising from trench foot. They follow the well-known routine lines of treatment of the acuter forms of flat foot, such as may follow an infective periarthritis, a crush, or the idiopathic forms sometimes seen. In the early stage, when the foot is too tender to touch, the patient is rested in bed absolutely, is massaged daily, and the shape of the feet gradually corrected with some suitable form of splint according to the deformity. When not too tender to be handled, though still too tender for the patient to stand on, the foot is moulded more firmly into correct shape in plaster-of-Paris bandages, and moulded by the surgeon's hands while the plaster is setting. Later the patient is able to get about in a walking plaster, such as those you will see.

CASE 23.—November, 1915: Trench foot; remained in France through the winter; discharged in March, 1916. Sept. 14th, 1916: Admitted; able to stand, but not able to walk much. Right foot is a typical claw foot and the left foot an extreme valgus as shown in the picture. (Fig. 42.) Sept. 20th: Both feet corrected in plaster. Oct. 11th: Plaster removed; right foot recovered (Fig. 43); ordered boot with bar on sole to maintain extension at the mid-tarsal joint. Left foot again put in plaster and will probably be ready in a fortnight for treatment in a boot with the heel raised a third of an inch on the inner side to maintain the inverted position which you see in the picture and in the patient's foot.

CASE 24.—November, 1915: Trench foot. On admission feet almost too tender to be touched; hallux valgus in both feet with the great toe tucked under the second and third. Treatment adopted: (1) Gradually straightened on splints and massage; (2) further moulded in plaster; (3) walking plasters in which you see the patient now. (Picture and patient shown.) Note that the hallux valgus splint has been incorporated in the plaster, as the deformity was tending to recur while the patient walked about in the previous plaster

splints. A plaster splint usually gets worn out in three to four weeks, less if the weather is wet, and must be immediately renewed with further correction if necessary, or the case will begin to relapse.

The methods of twisting and moulding a foot by means of plaster bandages are simply an application of familiar methods of correcting club-foot in infants, either with bandages or with sticking-plaster. It is only an application to plaster bandages of methods in everyday use by surgeons who are accustomed to use the direction and tension of their bandages for purposes of correcting or checking deformities. With your permission I will now give you a demonstration of the method with ordinary calico bandages, leaving to your imagination the firm control which can be got by plaster bandages when they set, as is shown in the case before you (Case 25), and in the pictures of the plaster being applied to this case.

The next case is that of a foot which I was urged to amputate on May 4th.

CASE 26.—The patient had been hit by a high-explosive shell on the left foot on April 30th, 1916. He was admitted to hospital on May 4th, 1916, with the forepart of the foot only attached by the soft parts of the sole. The head of the astragalus and the bases of the metatarsals were exposed in the wound. (Fig. 44.) Of the scaphoid and cuneiform bones there only remained a few scattered fragments. The wound surfaces were black and gangrenous and the whole foot extremely septic. The foot was fixed in position in a long crab splint and kept in it with continuous irrigation for several weeks. Formal dressings were only done at intervals; an anaesthetic was necessary on each occasion. Sequestra, of course, have come away on several occasions. I am now able to show you the kind of foot which is resulting from this continuous maintenance of one position. (Fig. 45.) You will note that the tendons are working on the forepart of the foot through the scar.

If I were to allow this patient to be without a splint and let the foot hang on the scar I believe that the scar would become more dense and that this mobility would be lost. In support of this statement I would quote an exactly similar case which was admitted to the hospital early in the spring. There was a similar scar across the dorsum of the foot. The scar was some months old, white, pucker and closely and firmly adherent to the subjacent bone, and there was, of course, no movement in the forepart of the foot in front of the scar. The toes were flexed and rigid and rather puffy. The treatment I adopted was to fix the foot in dorsiflexion in plaster-of-Paris and let the patient walk, the result being that in about two months' time the scar relaxed and the muscles began to act on the forepart of the foot through the scar. It was possible to follow this up by massage and exercise, and the patient left hospital with a shortened but very serviceable foot. I am extremely sorry that I did not keep photographic records of this case, as I consider it one of the most instructive that I have ever had, as it is a direct illustration of the principle that scarred tissue with a strain on it seems to feel a sense of responsibility and becomes hard and tough, while if relieved of the strain of this responsibility it relaxes and allows the muscles an opportunity of showing what they can do.

I trust that the cases I have demonstrated may serve to show that much can be accomplished towards the restoration of function in limbs which at first sight appear to be hopelessly impaired. These results can only be obtained by patience, perseverance, and an unwavering adherence to the plan of treatment without any intermission. The plan of treatment must be based on a firm belief in the principles of conservative surgery and in the value of rest, as first taught by Hilton and put in practice by Hugh Owen Thomas.

Before I sit down let me draw your attention to this old engraving, date 1783. It appears to be a sketch on Buzaglo's treatment of arthritis. According to the American Surgeon-General's Catalogue, he published in London a treatise on gout, and was sufficiently famous or notorious to be mentioned in Cruickshank's illustrations of the "Dance of Death." I have never been able to secure a copy of his book. I ask you to note the abducted position for treatment of the shoulder and hip, the right-angled shoe, and the splint in the corner, which is a rough forerunner of the Thomas knee splint. I would like to know more of this Buzaglo and his work, for he evidently knew and practised in 1780 some, at least, of the methods which have been reintroduced by Owen Thomas and Robert Jones and the school of surgeons who follow their teachings, among whom I take leave to include myself.

**REPORT ON SIX CASES OF  
AMOEBA HISTOLYTICA CARRIERS  
TREATED WITH EMETINE BIS-  
MUTHOUS IODIDE.**

BY CAPTAIN C. G. IMRIE, C.A.M.C.,  
AND  
LIEUTENANT W. ROCHE, R.A.M.C.

(Report to the Medical Research Committee.)

THE introduction of emetine in the treatment of amoebic dysentery marked an important advance in the treatment of this disease. In its action on the *Entamoeba histolytica* this alkaloid enjoys the rôle of a specific. However, experience has shown that emetine, as it is at present employed, does not always effect the destruction of this protozoan in its encysted stage. Thus, convalescents may continue over a considerable period of time to pass these cysts, which, as we know, are capable of transmitting the infection. From an epidemiological as well as a medical viewpoint the desirability of accomplishing the destruction of the entamoeba in the encysted stage is quite obvious.

It has been suggested by Dale that the failure of emetine by hypodermic administration to destroy the cysts of entamoeba may be due to the presence of the latter in healed pockets or sinuses, and thus more or less completely shut off from the circulation and tissue fluids of the body, and in support of this hypothesis he mentions the alleged superior efficacy of earlier treatment with ipecacuanha by oral administration. He has introduced a compound of emetine and bismuth iodide for oral administration, with which to obtain the advantages of the ipecacuanha and yet avoid its pharmacological action. He has reported promising results in cases treated with this double salt.

The presence of some cases of amoebic dysentery in No. 4 Canadian General Hospital provided an opportunity to study the action of emetine bismuthous iodide. The observations on which this report is based were made upon 6 cases, all known to be carriers of *Entamoeba histolytica* cysts. Of much additional interest is the fact that 4 of these cases had been previously subjected to a course of emetine hydrochloride—daily doses of 1 grain hypodermically for 10 or 12 successive days in this hospital, and notwithstanding this treatment continued to pass cysts in the faeces. The emetine bismuthous iodide was administered in doses of 3 grains on 12 successive nights. When given immediately after the light supper which the patients have at 7 P.M. its administration was always followed with nausea and in some cases vomiting. These undesirable symptoms were least in evidence when the patients received the drug with water at 10 P.M.

In the following protocols tabulated reports of the protozoological findings are given.

CASE 1.—Patient, aged 24, left England in October, 1915. In July, 1916, he was troubled with diarrhoea, which continued at intervals and finally caused his entrance to hospital in August. Received emetine, 1 grain hypodermically, from August 26th to 30th.

Table of Findings.

Date.	Type of stool.	<i>Ent. coli.</i>	<i>Ent. coli</i> cysts.	<i>Ent. hist.</i>	<i>Ent. hist.</i> cysts.	<i>Lamblia</i>	<i>Lamblia</i> cysts.	<i>Coccidia</i> .
Aug. 8 ...	Brown unformed.	+	+	—	+	—	—	+
" 17 ...		+	+	+	+	—	—	+
" 23 ...	Liquid mucus.	—	—	—	—	+++	+++	—
" 24 ...	Brown unformed.	+	+	+	—	+	++	+
" 20 ...		+	+	—	—	—	—	—
" 31 ...		+	+	—	—	—	—	—
Sept. 2 to 9†		+	+	—	—	—	—	—
" 10 to 16	With mucus.	—	—	—	—	—	—	—
Sept. 16 to 1 Oct. 14... †	Brown unformed.	—	—	—	—	—	—	—

\* E.B.I. nightly from Aug. 31 to Sept. 12. † No protozoa. 1 *Amoeba coli* and *Amoeba coli* cysts on various days, but no other protozoa.

CASE 2.—Patient in Gallipoli in April, 1915. In July became ill with dysentery and was sent to hospital, where he was treated with emetine. In May, 1916, when in Egypt, had an attack of dysentery, and was sent to a general hospital and treated with emetine. In July, 1916, was admitted to a general hospital in this area.

Table of Findings.

Date.	Type of stool.	<i>Ent. hist.</i>	<i>Ent. hist.</i> cysts.	
Aug. 8	Light brown, faecal and mucus.	+	+	{ Aug. 6 to 18: Treated with emetine 1 gr.
" 9	Brown unformed.	+	—	
" 21	"	—	+	—
" 29	"	+	—	—
" 30	"	+	—	{ E.B.I. daily till Sept. 12.
" 31	"	+	+	
Sept. 1 to Oct. 14	No amoeba or cysts were found in stools which were brown and unformed.			

This patient had also a tetramitus infection which disappeared on Aug. 31.

CASE 3.—Patient had dysentery in Gallipoli in October, 1915; was given 12 to 16 injections of emetine. Admitted to hospital in this area on August 17th, 1916, with diarrhoea.

Table of Findings.

Date.	Type of stool.	<i>Ent. hist.</i>	<i>Ent. hist.</i> cysts.	
Aug. 17	Brown unformed.	+	+	{ Aug. 17 to 29: Emetine daily hypodermically 1 gr.
" 30	"	+	+	
" 31	"	+	+	{ Aug. 31: E.B.I. commenced.
Sept. 1	"	—	—	
" 2 to Oct. 14	No protozoa.			

This patient had a tetramitus infection.

CASE 4.—Patient had dysentery in Egypt in 1915. Had diarrhoea at intervals between January and August, 1916. Admitted to hospital on August 5th with diarrhoea.

Table of Findings.

Date.	Type of stool.	<i>Ent. hist.</i>	<i>Ent. hist.</i> cysts.	
Aug. 6	Brown unformed.	+	+	{ Aug. 7 to 15: Emetine 1 gr. daily hypodermically.
" 12	"	—	—	
" 29	"	—	+	—
" 31	"	—	+	{ Aug. 31: E.B.I. commenced.
Sept. 3 to 14	No " protozoa.			

This patient had a tetramitus infection.

CASE 5.—Patient admitted to hospital on Sept. 14th, 1916. Had no previous history of dysentery, nor had he been in an infected area.

Table of Findings.

Date.	Type of stool.	<i>Ent. hist.</i>	<i>Ent. hist.</i> cysts.	
Sept. 15	Faecal, with little blood and mucus.	+	+	{ E.B.I. commenced.
" 19	Brown unformed, mucus.	+	+	
" 21	Brown unformed.	—	+	—
" 22 to Oct. 20	No protozoa found.			—

CASE 6.—Patient had no previous history of dysentery.

Table of Findings.

Date.	Type of stool.	<i>Ent. hist.</i>	<i>Ent. hist.</i> cysts.	
Sept. 25	—	+	—	{ E.B.I. commenced.
" 26	—	+	—	
" 27 to Oct. 20	No protozoa found.			—

As is shown in the preceding protocols, 5 of the cases ceased to pass *Entamoeba histolytica* in the active or encysted form 48 hours after the institution of treatment. The sixth case continued to pass cysts for six days, after which the microscopic findings were negative. These observations have a greater significance when it is remembered that 4 of the cases had previously received a course of emetine hydrochloride, despite which they continued to pass the entamoeba in its active or encysted stage. Our observations in these 6 cases confirm the results obtained by Dale<sup>1</sup> and subsequently by Low and Dobell.<sup>2</sup>

The drug was obtained, through the kindness of Lieutenant-Colonel Dudgeon, R.A.M.C., from the Medical Research Committee.

<sup>1</sup> THE LANCET, 1916, II., 183.

<sup>2</sup> THE LANCET, 1916, II., 319.

## SURFACE-TENSION AND THE WASSERMANN REACTION.

BY VINCENT B. NESFIELD, F.R.C.S. ENG., &c.,  
MAJOR, INDIAN MEDICAL SERVICE.

IN February, 1916, it occurred to me to test the bearing of surface-tension (S.T.) on the Wassermann reaction in view of the fact that S.T. plays an important rôle in adsorption phenomena. This inquiry naturally led on to a further one into the tension-lowering effect of alcohol, which is the main constituent of the antigens used in the test. The conclusions to which I came were as follows: 1. That S.T. is the all-important factor in the Wassermann reaction. 2. That alcohol, bile, carbolic acid, and solutions of cholesterolin, which act as antigens in the Wassermann test, all have very low S.T. and greatly reduce the S.T. of serum. 3. That it is difficult to distinguish a syphilitic antigen from a substance which lowers S.T.

These facts are capable of easy verification, but their explanation is a more difficult matter. The question suggests itself: Did Wassermann recognise the S.T. lowering action of alcohol? I think myself that he must have known but intentionally suppressed the knowledge because, the test being founded on the Bordet-Gengou reaction, few would have given credence to it if alcohol alone, or with the addition of  $\frac{1}{2}$  per cent. carbolic acid, had been used in place of a specific extract.

In this connexion the history of the test is informing. An extract of syphilitic liver was first used, one gramme of liver being extracted with carbolised saline. Then it was shown that normal liver was as efficient. In each of these cases the best fluid contained bile salts and carbolic acid. As it was found that these watery extracts were unstable, alcohol was added, and it was then discovered that almost any organ of any animal produced an excellent antigen, the reason obviously being that it is the alcohol itself which is the antigen.

*The test employed.*—For the purpose of my inquiry I followed Fleming's modification of the Wassermann test, previously sensitising the sheep's red blood corpuscles with haemolytic serum (Allen and Hanburys). The antigen I used as a control was an alcoholic extract of human heart 2 parts and 1 per cent. alcoholic solution of cholesterolin 1 part, the procedure being as follows:—

One volume of unheated serum was mixed with 4 volumes of a 1 in 20 dilution of antigen in saline. This was kept at 98° F. for 30 minutes, and then 1 volume of a 1 in 5 emulsion of the sensitised sheep's corpuscles was added and the tubes incubated again for one hour. 1 in 40 and 1 in 80 dilution of antigen were also used in each case so as to determine the degree of reaction. I put up precisely similar tubes, using 95 per cent. alcohol in dilutions of 1 in 20, 1 in 40, and 1 in 80 in place of the extract, and also 95 per cent. alcohol in the above dilutions, plus 1 volume  $\frac{1}{2}$  per cent. carbolic acid.

The serum used was from patients with typical syphilis, and the controls were known to be free from syphilis. The experiments were repeated again and again, always with the same result, and lead to the conclusion that 1 in 20 alcohol absorbs alexin from syphilitic serum and not from normal. 1 in 80 alcohol, plus 1 in 1000 carbolic acid, acts in the same way, so that carbolic acid, like cholesterolin, increases the antigen power of alcohol, while at the same time reducing the S.T.

*The instrument for measuring surface-tension.*—A simple definition of S.T. is the force which drives a fluid against gravity up a fine capillary tube. The only text-book methods which I could find for S.T. were based: either on a comparison of the height to which different fluids rise in capillary tubing of constant bore, or on the rate of flow of the different fluids under constant pressure through capillary tubing. Both these methods present practical difficulties, making them inaccurate in my hands and not sensitive enough for the purpose I had in view. It is obvious that the rise of a column of fluid up a very fine capillary tube exerts an easily measurable pressure. All that is necessary is to hold down the fluid with a column of air and measure the pressure required to do so. For this purpose I drew out a stout glass capillary to a fine point and dipped it in the fluid to be tested. The capillary was then connected by a rubber tube with a 4 oz. bottle half filled with water, and closed by a rubber cork with three perforations: one for the capillary connexion, one for a manometer,

and one communicating with a rubber ball by squeezing which a pressure could be set up. The manometer was a glass tube graduated in millimetres passing to the bottom of the bottle and, in order to make it more sensitive, bent at an angle of 45°, thus increasing the length of the column of water denoting a particular pressure. A typical experiment was conducted thus:—

The capillary point was made to dip in distilled water. The rubber ball was squeezed, and water from the bottle rose in the manometer to 800 mm. A clip was applied between the rubber ball and the bottle to maintain the pressure. Air bubbled out of the fine capillary opening through the distilled water, while the water level in the manometer gradually sank till the escape of air from the fine point ceased. The water in the manometer now stood at 700 mm. Absolute alcohol was now substituted for the distilled water. Bubbling at once recommenced, and the manometer sank to 70 mm. The S.T. can now be stated as the ratio between the manometer reading for water and the reading for alcohol.

The following liquids were also tested and found to possess low S.T.: ether, xylol, benzene, petrol, petroleum, peppermint oil, and nitric acid. Solutions of sodium chloride and sodium citrate in water raised the S.T. a little, while sodium salicylate (belonging to the carbolic group) reduced it.

A further useful application of this simple apparatus is that by estimating the S.T. of dilutions of alcohol, carbolic acid, &c., it provides an accurate method of determining the percentage composition of such solutions. The presence of sugar does not impair the accuracy of the determination which therein possesses a great advantage over the hydrometer.

I am informed that an apparatus on similar lines has been used in alcoholometry, but I have not seen it, nor read an account of it. I showed my apparatus to Colonel Sir W. Leishman, Colonel F. R. Ozzard, I.M.S., Major W. E. McKechnie, I.M.S., to all of whom it was a novelty, and I was under the impression at the time that I was the first to use this principle. I believe that it will have an important application in the detection of adulterations, and that it will become the rule to state the S.T. when describing a liquid or salt solution.

## Clinical Notes:

### MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

#### NOTES OF A CASE OF TRAUMATIC HERNIA OF THE DIAPHRAGM PROVING FATAL SEVEN MONTHS AFTER THE WOUND.

BY C. P. SYMONDS, M.R.C.P. LOND.,  
TEMPORARY CAPTAIN, R.A.M.C.

ALTHOUGH in this case the rent in the diaphragm was so large that nothing could have been done to repair it, it is possible that such cases may occur again and that an earlier diagnosis might enable the surgeon to operate with some hope of permanent relief.

Private —, of the S.A.I., aged 29, was admitted to the Connaught Hospital on the afternoon of August 31st, 1916. He had had no previous illness and had led a vigorous and healthy life. In February, 1916, while fighting against the Senussi, he was hit when stooping forward, so that the bullet, entering over the left scapula, apparently came to rest in the subcutaneous tissues of the abdominal wall in the left hypochondrium. He was taken to a dressing station where he vomited some blood, and subsequently to a base hospital at which an operation was performed on his abdomen and he believed the bullet was removed. Both wounds were healed in ten days; he was kept in bed for five weeks, became restored to full health and was eventually discharged to duty.

About six weeks after the original wound he had his first attack of abdominal pain; it was very slight. Subsequently he had many such attacks, three or four a month; although more severe latterly he had not felt ill enough to report sick. The attacks were nearly always preceded by constipation; he then had a premonitory feeling of uneasiness in the abdomen, and if he could now get his bowels to open well could sometimes avert the attack. The pain came on after or half-way through a meal and would pass off in a few minutes, being

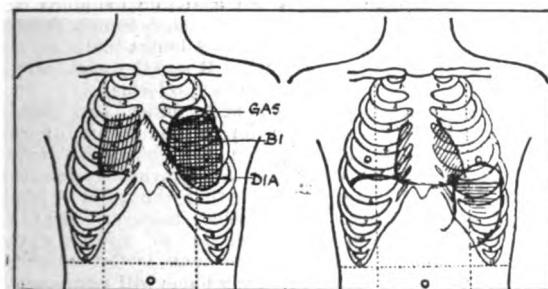
relieved when he lay on his right side; while it lasted it was very severe, but in between the attacks he felt quite well, though he thought his wind was not as good as it had been.

He was admitted in what he described as a typical attack, but much more severe than any before experienced. His bowels had not been open for two days, and then half-way through breakfast had come on the pain; he vomited the food just taken, but with no relief. On examination he proved to be a well-developed man of normal physique; over the centre of the spine of the left scapula was the scar of the entrance wound; in the middle of the left hypochondrium was a healed two-inch linear incision. He complained of a dull continuous pain across the upper abdomen, to which were added occasional paroxysms of agony, during which he turned pale and cold and broke out into a sweat, while his pulse was small, slow, and irregular. The position he adopted during these paroxysms was very striking, sitting bolt upright with his knees huddled up to his chin, the slightest attempt at straightening the back being intolerable.

On inspection and palpation the left hypochondrium appeared emptier and the left thorax fuller than on the other side. The physical signs in the chest resembled those of a hydropneumothorax. The right border of the heart was 2½ inches to the right of the sternum; the apex beat was not palpable, but was best heard in the fourth left space close to the sternal margin. At the apex of the left lung the percussion note was of a higher pitch than at the right, and the breathing was bronchial. But from the second space downwards the note was tympanitic all over the cardiac area and continuous with the stomach resonance. There were no breath sounds over this area, but with the patient in the sitting position curious tinkling sounds were audible in the third space. The signs at the back were similar, and bell sounds with coins were easily demonstrated.

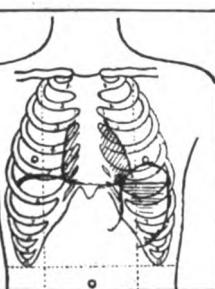
The true diagnosis did not strike me at the moment; I thought the dilated stomach was pushing up the diaphragm. But in a quiet interval between two paroxysms I gave the patient 3 ounces of bismuth carbonate, and with the help of Captain F. S. Hawks, radiographer to the hospital, examined him with the screen. The horizontal position was the only one available, but the picture obtained was quite definite. (Fig. 1.)

FIG. 1.



To illustrate X ray appearance on Aug. 31st. DIA, Diaphragm.

FIG. 2.



X ray appearance on Sept. 19th.

All the bismuth was contained in the stomach, which reached up to the second left rib in front, and above it could be seen the dense compressed lung. The time for observation was limited, for a paroxysm of pain compelled the patient to revert to the sitting position; but Captain Hawks was able to see a fine shadow to the left of the lower end of the stomach, having a slight vertical movement with respiration, which he took to be the diaphragm. The diagnosis of diaphragmatic hernia was now made. Most of the bismuth was removed by means of a stomach-tube and evacuator, but this gave no relief.

Two doses of gr. ¼ of morphia were given in the night and the patient had a little sleep still in the sitting posture, and as his general condition was better he was transferred early next morning to the care of the surgeons at the Cambridge Hospital. Here his condition rapidly improved, the pain disappeared, and in a few days he was able to take his food without discomfort.

Through the courtesy of the officer commanding the Cambridge Hospital and the officers in charge of the case I was able to see the patient again 19 days later. No operation had been performed and he was apparently in normal health. Physical examination showed the stomach resonance to reach the fourth rib, and the heart was a little displaced to the right. This was confirmed by X ray examination in the vertical position. (Fig. 2.) The left dome of the diaphragm showed as a clear, thin line, with no breach in its continuity; the stomach lay below it, and the picture

was apparently that of distension of this viscus with consequent stretching of the diaphragm. There can be no doubt, however, that the correct interpretation of this picture was that the surface area of the diaphragm was increased and its contractile power diminished by reason of the large gap in its substance which was subsequently discovered, and that the high position of the stomach with displacement of the heart was consequent upon this. There was now some debate as to the validity of the original diagnosis. Those who opposed it brought forward the argument that the bullet, if it had indeed passed through the diaphragm, must have damaged the scapula, of which a plate was produced showing no evidence of injury; moreover, that continuing its course it could hardly have failed to pierce the heart and so cause death. Subsequent events showed the fallacy in any argument based on the theoretical course of a modern bullet between wounds of entrance and exit.

A fortnight later the patient had another attack of abdominal pain; operation was performed and the hole in the diaphragm found, but his condition was desperate and he subsequently died of shock. At the post-mortem a large circular opening with quite smooth and rounded edges was found near the centre of the left dome of the diaphragm which would admit of a medium-sized hand being passed into the thorax, in which were contained the stomach, great omentum, transverse colon, and the upper half of the small intestine, the last being kinked in several places, distended, and of a deep plum colour. The stomach reached as high as the second rib and was partly adherent to the chest wall; the apex of the heart lay just to the left of the sternum. Finally, the expanded copper casing of a rifle bullet was discovered in one edge of the wound of the diaphragm, but no trace of the leaden core was found; presumably it was that which had been removed from the abdominal wall.

A remarkable point about this case is the length of the history. The wound in the diaphragm must have existed from the first, and apparently the increased intra-abdominal pressure resulting from constipation was the occasional cause needed to force a knuckle of stomach through the opening. The contractions in this knuckle set up by taking food then caused the agonising pain, partly relieved only by the crouching position, in which the tension of the diaphragm was reduced to its minimum. To this was added the continuous ache, probably due to the drag of the stomach and other viscera upon their peritoneal attachments. Up till the attack in which I first saw him spontaneous reduction must have occurred quite easily on every occasion, and eventually happened even after the stomach had been above the diaphragm for at least 24 hours. Of the symptoms when the patient was first seen, the most important features were the presence of gastric distension and abdominal pain without vomiting, the fact that the condition was not relieved by the passage of a stomach-tube, and especially the posture adopted.

I am indebted to Lieutenant-Colonel W. Turner, officer commanding the Connaught Hospital, for permission to publish this case.

Aldershot.

#### A NOTE ON THE BLOOD CHANGES IN GAS POISONING.

BY JAMES MILLER, M.D. EDIN., F.R.C.P. EDIN.,

CAPTAIN, R.A.M.C. (T.);

AND

HARRY RAINY, M.A., M.D. EDIN.,

CAPTAIN, R.A.M.C. (T.)

We venture to draw attention to a point which appears to be of some interest, and possibly of importance, which has recently come under our notice as the result of differential blood counts in cases of gas poisoning. We have not yet examined any very large number of cases, but we are extending our observations, and hope to publish them in detail at an early date. We have made inquiries and have looked up some of the literature—e.g., the Memorandum on Gas Poisoning in Warfare, with Notes on its Pathology and Treatment—and have failed to find any similar observation.

We append a table of a series of 14 cases taken at random, an analysis of which appears to bring out the following facts: 1. A case which has been gassed sufficiently severely to produce symptoms lasting for some time shows a more

or less marked relative lymphocytosis. 2. This change in the blood takes some time to develop. Probably three to four months at least must elapse before the change appears, but once it develops it does not disappear for some time, apparently for at least a year, if symptoms of any kind persist.

No.	Leucocyte count.	Poly-morphs.	Mono-nuclears.	Lympho-cytes.	Eosino-philes.	Mast cells.
	per c.m.m.	%	%	%	%	%
1	5703	50·2	4·6	40·8	3·4	0·8
2	—	53·19	5·5	40·0	0·4	0·8
3	5968	47·6	2·6	44·6	1·8	1·8
4	6570	33·5	3·7	60·0	1·0	0·7
5	—	58·2	2·8	33·4	4·6	0·9
6	6570	51·2	1·4	45·2	2·2	—
7	7812	58·5	3·8	35·04	2·5	—
8	—	37·5	3·2	56·3	2·6	—
9	6562	39·9	4·3	51·7	3·2	0·8
10	8124	62·3	4·3	30·2	1·2	1·9
11	7184	72·1	2·5	23·4	2·0	—
12	9636	75·7	1·2	21·7	1·2	—
13	5000	35·3	2·7	58·2	3·2	0·2
14	8122	47·9	2·4	47·6	0·3	1·5

Note.—The results represent an analysis of 300-500 leucocytes, and in several instances the counts were repeated on more than one occasion and by more than one observer.

#### Remarks.

1. Gassed June, 1916. Helmet was blown off, and he lay in a wounded condition exposed to gas-shell attack. Nausea the only after-symptom.
2. Gassed June, 1916. Marked symptoms. Discharged from Army as result (September, 1916).
3. Gassed September, 1915. Marked eye symptoms and tremors still present.
4. Gassed April, 1916. Fairly severe, cannot march any distance. Tremors.
5. Gassed Sept. 25th, 1915, very slight, did not report sick, no symptoms now.
6. Gassed September, 1915. Suffers still from eye symptoms and tremors.
7. Gassed July, 1916. Exposed for a short time, no symptoms.
8. Gassed September, 1915. Buried near a burst cylinder. Unconscious for four hours.
9. Gassed October, 1915. Exposed for 20 minutes, dazed, cough for three months.
10. Gassed September, 1915. Very slight, no after-effects.
11. Gassed December, 1915. Very slight, no after-effects.
12. Gassed July, 1916. Rendered unconscious, suffers from cough, tightness in chest.
13. Gassed April, 1915. In hospital at the time. Hospital blown up. Unconscious for a few hours. Cough, shortness of breath, and nausea.
14. Gassed September, 1915. Unconscious for four days. Intense nausea, and vomiting for several days. No cough.

We are not able to state whether this sign is present in all types of gas poisoning or only in certain of them, because it is a difficult matter to obtain any definite information on this point from the patient himself. As regards the number of the leucocytes per cubic millimetre there does not appear to be any marked change, if anything there is a slight reduction.

Dr. H. Fielden Briggs has been elected by the dental practitioners of the Transvaal to represent them upon the Transvaal Medical Council.

THE LATE DR. P. G. BORROWMAN.—In Philip Grierson Borrowman, who died at the age of 62 on Dec. 17th last after a short illness, the profession in Edinburgh has lost a much respected member. Though subjected during much of his professional life to the restrictions of ill-health, Dr. Borrowman had a large and varied experience of medical work in many spheres, having practised in Earlston, Colombo, Elie, Crieff, Troon, and latterly, for six years, in Edinburgh. He also found time to make a number of short practical contributions to medical journals. In his later years in Edinburgh his health improved considerably, and in addition to his practice he has had recently the satisfaction of taking work for younger men who have gone abroad and of doing a certain amount of war service of various kinds, besides holding the post of surgeon to the mounted constables. He has left a widow, two sons, and a daughter. Of his sons one is a minister of the Church of Scotland, the younger is an officer in the Indian Army; both are on active service.

## Reviews and Notices of Books.

### Medical Diseases of the War.

By ARTHUR F. HURST, M.A., M.D.Oxon., F.R.C.P.Lond., Temporary Major, R.A.M.C.; Physician and Neurologist to Guy's Hospital; Neurologist to the 3rd Southern General Hospital; lately Member of the Medical Advisory Committee, Mediterranean Expeditionary Force, and Consulting Physician to the Salonica Army. London: Edward Arnold. 1917. Pp. 151. Price 6s.

THIS is an opportune and admirable book.

The first of the ten chapters is on functional nervous disorders, and contains an interesting account of shell shock. Some stress is laid on the initial minute changes in the central nervous system as forming the organic basis for the symptoms which persist and become exaggerated from psychical causes. No definite line can be drawn between cases with obviously organic symptoms and those with obviously hysterical manifestations due to auto-suggestion, and many intermediate cases occur. For the hysterical symptoms hypnotism is eminently successful, and everyone in charge of the neuroses of soldiers should be capable of carrying out this method of treatment. In Chapter II. the various forms of dysentery are clearly described. With regard to the presence of *Lambia intestinalis* in the stools it appears that importance should be attached to them only when there are concomitant symptoms. It is remarkable how few cases of amebic hepatitis and hepatic abscess have been recognised. In patients with bacillary dysentery who have previously had antitoxic serum for other diseases, or who suffer from asthma, the danger of anaphylaxis can be obviated by subcutaneous injection of 1/10 c.c. of the multivalent serum before intramuscular injection of 20 c.c. of the serum. In ordinary cases the serum is given intravenously so as to ensure the most rapid neutralisation of toxins by the antibodies. War nephritis and both forms of trench fever were seen at Salonica, where the available evidence confirmed the opinion formed in France that trench fever is spread by lice. It was not possible at Salonica to distinguish clinically between paratyphoid A and B, and there was no real difference between the severity of the two forms.

Epidemic jaundice is dealt with under two heads: (1) Among the Mediterranean forces, due to an infective duodenitis; (2) in France, due to *Spirocheta ictero-hæmorrhagica*; as this disease was previously described by the French the author urges that the term "Weil's disease" should lapse. In practice, however, the title *spirochætosis ictero-hæmorrhagica* is so unwieldy that unless some shorter and distinctive name is forthcoming it seems to us unlikely that the enemy name will permanently fall out of use. It is also, perhaps, open to question if all the cases of jaundice on the Western front were of the same nature, especially as the mortality (6 per cent.) was so much lower than that of spirochetal jaundice in Japan and Egypt (30 per cent.). Dr. Hurst considers that beri-beri as seen at Gallipoli was due to a duodenal infection, similar to that described in 1905 by Hamilton Wright, and that though the anti-beri-beri vitamine was probably a contributory factor it was not the sole cause. It is significant how frequently this form of peripheral neuritis followed jaundice, and an apt comparison is drawn between this sequence and that of diphtheria and paralysis.

Under the etiology of the soldiers' heart the claims of intoxications, over-exertion, and nervous strain are clearly discussed; and in regard to the first it is pointed out that as over-activity of the thyroid is more easily detected than that of the other ductless glands, this form of cardiac disease has been called hyperthyroidism, but that there is really a disturbed activity of all the ductless glands. In this form of soldier's heart, due to a "vegetative neurosis," the blood pressure is raised, in contrast to its low level in the other forms, and this is regarded as evidence against simple hyperthyroidism, the author stating that in uncomplicated Graves's disease the blood pressure is not raised—a conclusion on which there is, perhaps, room for discussion.

The sections on the various diseases are well written, are in due proportion to their interest and importance, and should ensure a second edition at an early date, when perhaps some further chapters might be added.

*The Treatment of Infantile Paralysis.*

By ROBERT W. LOVETT, M.D., Boston. London : William Heinemann. 1916. Pp. 163. Price 8s. 6d.

As the title of the work indicates, it deals chiefly with the treatment of the affection, but there is a short introductory chapter on the pathology, symptoms, types, mortality, diagnosis, and prognosis of the disease. With regard to the mortality, it is interesting to note that in no instance did it reach the high percentage recorded in the American epidemic of 1916. The author asserts that complete recovery without atrophy occurs more frequently than is generally thought, and quotes figures from the Massachusetts epidemic showing that it amounted to 27 per cent.

The treatment is described in four chapters, that of the acute phase, the convalescent phase, the chronic phase, and operative treatment. In regard to the acute phase, the author sums up the treatment with these words, "Rest until the tenderness has disappeared, absence of meddlesome therapeutics, either medicinal or physical, the use of warm baths in the later part of the period, and the prevention of contraction." The treatment during the convalescent phase consists in teaching the patient to walk, the prevention of deformity by the use of instruments, and the application of massage, heat, electricity, and muscle training. To this latter the author devotes a special chapter, giving detailed instructions of the position in which the limb should be placed in order to bring into action individual muscles. This is probably the most important chapter in the book, and the author acknowledges the aid he has received from his assistant, Miss Wright, in this matter. The numerous deformities liable to occur during the course of the disease are described and figured, and the various methods, both instrumental and operative, are discussed. The final chapter deals with "muscle test," a test by which under conditions of constant position and leverage, by a series of spring balance pulls, the power of the muscles which govern the movements of the limbs can be registered.

The book is well illustrated with photographs and diagrams of the procedures for dealing with the many conditions of muscular weakness and deformity caused by poliomyelitis.

*Medical and Veterinary Entomology.*

A Text-book for Use in Schools and Colleges, as well as a Handbook for the Use of Physicians, Veterinarians, and Public Health Officials. By WILLIAM B. HERMS, Professor of Parasitology in the University of California. New York : The Macmillan Company. With 228 illustrations. Pp. 393. Price 17s. net.

THE author of this book has done good service in bringing under one cover the widely scattered literature of medical and veterinary entomology. He has not rushed into print, for he states that he has spent six years in gathering information and making investigations and observations in this special field. The result appears to justify his labours. The subject-matter is well arranged; the illustrations, many of which are original, are apt and good, and the whole field of prevention of disease due to insects is effectively covered. We think the author is at his best in the chapters on mosquitoes, the common house-fly, and the control of rats and rat-fleas. He describes the extermination of bubonic plague in the city of San Francisco by measures dealing with the last-named pest. He regards the cockroach as a possible carrier of tuberculosis, dysentery, cholera, and typhoid fever. The life-history and habitat of the various pests are dealt with in chapters on cockroaches, beetles, lice, bugs, mosquitoes, house-flies, blood-sucking mscids, flesh flies, fleas, ticks, and mites, and the book concludes with an interesting chapter on venomous insects and arachnids. It will form a welcome addition to the library of the sanitarian and epidemiologist.

## LIBRARY TABLE.

*Paton's List of Schools and Tutors, 1917.* London : J. and J. Paton. Pp. 999. Price 2s.—This is the nineteenth annual issue of a thoroughly useful publication and does not differ in arrangement from the immediately preceding issues. We have, first, a classified list of schools, comprising an index of preparatory and other schools for boys and girls in the three divisions of the United Kingdom. Lists are also given of prizes and scholarships at the various

schools, as well as of special schools and training colleges for technical instruction. Where possible, full information in respect of fees is appended. Useful little essays will also be found on the education necessary to obtain Civil Service appointments, military and naval commissions, and commissions in the mercantile marine, while the portals of the professions of architecture and medicine are examined. The essay on the entrance to the medical profession is a particularly sensible one; it gives to the lay parent the necessary information in a popular form.

*The Passing On of Life: A Talk about Ourselves.* By the Viscountess FALMOUTH. London : George Routledge and Sons, Limited. 1916. Price 1d.—This tract on the reproduction of the human species is a section of the author's "Talks about Ourselves: Simple Teaching in Hygiene and Physiology," which has been extracted from the book and enlarged to make its message clearer. It is a complete estimate of the pamphlet to say that on a very difficult and delicate subject the message is perfectly clear. Lady Falmouth follows lines that have been followed before, in preparing the minds of the juvenile readers for whom she writes, when she begins by an explanation of plant fertilisation. A sketch of bird life follows and introduces us to cattle-breeding and its eugenic theories, before the sex question as it affects the human race is actually touched upon. Here, taken with all that has preceded, quite enough is taught, and the religious tone of the passages which inculcate the value of self-restraint and the influence of right thinking is impressive in its direct simplicity. The dissemination of this unpretentious tract should be very valuable, especially at a time when the absence by over-employment of many parents makes the up-bringing of children difficult if they are to be kept in the right way.

*The Greek Tradition: Essays in the Reconstruction of Ancient Thought.* By J. A. K. THOMSON, M.A. London : George Allen and Unwin, Limited. Pp. 247. Price 5s. net.—Mr. Thomson's book is a further development of his Studies in the *Odyssey*, and will be a revelation to all whose acquaintance with the classics has been in the nature of a mechanical task or a form of educational gymnastics. Not merely do the characters live, but the author's lively and instructed imagination has reconstructed a background of contemporary colour which makes the whole topical. We commend the book to all those to whom ancient Greece has hitherto been a sealed book.

## MISCELLANEOUS VOLUMES.

A SERIES of handbooks is now being issued, under the common title of Mind and Health Series (London : William Heinemann. Price 5s. net each). The wish of the editor, Mr. H. Addington Bruce, is to extend a popular knowledge of such developments of psychological research as bear more obviously upon social and individual welfare. The first four volumes deal with the investigation of what is known as the "subconscious territory of the human mind," an attempt being made to explain the way in which mental processes are carried on behind or beneath consciousness, and to estimate how far these processes affect what is generally termed the character of the individual, as illustrated by motives and behaviour. A whole literature of a quasi-scientific or quasi-medical character has grown up of recent years in this direction, but these small volumes are intended rather as a recognition of the demand made by teachers, parents, and other responsible citizens for instruction.

The opening volume, "Human Motives," has been written by Professor James Jackson Putnam, emeritus professor of diseases of the nervous system at Harvard University and a highly esteemed worker in the field of medical psychology; it has a more general character than the other volumes of the series so far issued. The attempt is made within a very brief compass to erect a practical philosophy of life for the assistance of the teaching of modern psychology. Finding in nature two sets of motives behind action—namely, those promoted by love of humanity and freedom, and those unconsciously entertained, being legacies from forgotten portions of life and experience—Professor Putnam urges that real self-knowledge must follow the discovery of how much the first set of motives are influenced by the second. From a description of the main sources of motives he passes naturally to consider not only the bearings of psycho-neuroses and the development of consciousness, but also religion, when regarded as a standard of motives.

He presents the reasons why an industrious psychological worker finds his religious convictions to have been strengthened by his experience.

In the second volume of the series, "The Meaning of Dreams," Dr. Isador H. Coriat, assistant physician for nervous diseases to the Boston City Hospital, surveys the principles of dream-analysis along the lines formulated by Freud. Freud's work in this direction he describes as one of the greatest advances ever made in the knowledge of human mind and human motive. The examples of dream-analysis contained in the book follow methods well known to our readers, who will not with any unanimity be prepared to endorse the views expressed. The general editor of the series is on safer ground in "Sleep and Sleeplessness," wherein the various theories of sleep are exposed, prominence being given to recent experimental studies in the attempt to illustrate the causes and treatment of sleeplessness, as well as to discuss the apparent relationship of dreams with what is called the "supernatural." The theories quoted are not all of equal scientific standing, nor will all the stories emerge with equal credit from minute examination, but this is a very interesting little book. Dr. Dearborn strikes new ground in the fourth essay, "The Influence of Joy," which purports to be an account of modern methods of research into the specific effects of joy and other emotions. "The scientific economics of joy and happiness"—this is exactly what he writes—"remains to be developed, and our thesis insists that it is developable. In other terms, joy has an evaluation (even if not yet in figures) in State Street on the bulletins of the Stock Exchange; in the concrete-and-glass factory of Mr. Shoemaker; among the maids in your home; in the coal-mine; aboard ship; in your own private accounts which you keep to satisfy the income-tax collector. Daily joy has money value as well as soul value, even in the manual trades. And soon some man (or, more likely perhaps, some ingenious woman economist) will begin to reduce it to grades, to 'standardise' it and to find its mean financial value to all sorts and conditions of workers." We learn from this book the close connexion between happiness, or at any rate content, and high working efficiency, but it is doubtful whether a treatise required to be written in order to prove that the emotions of happiness stimulate the bodily functions and cause thereby a more satisfactory output of effort with correspondingly good results.

All these books are laudable in their endeavour to make the public free of information in directions where its supply might lead to an improvement of morals, or the erection of needed standards of conduct. Further, if the teaching is often sketchy and the meaning of the authors thereby obscured, we must remember the difficulties of the attempt to translate into simple terms the conclusions of complicated thinking. But there is no note taken of the difference between scientific literature and pretentious jargon, or between real and imitation scientific procedure, so that questions that perplex many thoughtful persons remain without trustworthy answer. To cite Sigmund Freud's revolting work is not to enunciate the accepted truth, even if the German psychologist is not so wholly obsessed by sex questions as he appears to be; and some of the other writers quoted as authorities can have no authority whatever.

Dr. R. W. MacKenna's book (*The Adventure of Death*) London: John Murray, 1916 Pp. 168 Price 3s. 6d. net) covers certain extent ground that passed over by the volumes in the Mind and Health Series. He has considered the subject of death from different points of view, not necessarily the obvious ones, and the result is an essay of a really inspiriting sort. Fear he finds to be absent from most death-beds, and pain to be quite unusual at the end, however bitterly it may have accompanied the earlier stages of some diseases. A short chapter enumerating what life gains from death exemplifies well the words of Robert Browning, which are quoted by the author in this connexion:—

You never know what life means till you die.  
Even throughout life, 'tis death that makes life live,  
Gives it whatever the significance.

Dr. MacKenna utterly discredits the materialistic school, and finds on every side that man is more than matter and that personality survives the grave. At a time like this, when millions are facing sudden death daily, and when their parents and wives, children and friends, are filled with apprehension of their fate, this fine little essay may prove a consolation with a wide message.

## Reports and Analytical Records FROM THE LANCET LABORATORY.

### EUCALYPTOL (CINEOL).

(HUDSON'S EUMENTHOL CHEMICAL COMPANY, LIMITED, SYDNEY, AUSTRALIA. LONDON AGENCY: F. NEWBERY AND SONS, LIMITED, 27 AND 28, CHARTERHOUSE-SQUARE, LONDON, E.C.)

AN examination of this brilliantly clear colourless oil gave indications of a very high eucalyptol or real cineol content. Thus its specific gravity was found to be 0.9295, whereas the oils showing a small proportion of cineol have a decidedly lower density. In fact, we have not examined a eucalyptus oil showing a higher density than is here recorded. We understand that the oil has been prepared by a freezing separation method. We found that its boiling point lay between 165 and 170° C. There were just traces of moisture present. An oil showing these constants should be well adapted for medicinal purposes. It is free from irritating constituents such as aldehydes and can be inhaled without causing coughing. It is noteworthy that eucalyptus on oxidising in contact with the air produces a fair amount of ozone.

### "SMALL TEA."

(BROOKE BOND AND CO., LIMITED, GOULSTON-STREET, ALDGATE, LONDON, E.)

We have already reported in these columns upon a sample of what is called "small tea," which is stated to consist only of the fine part of the leaf edge. On analysis a five minutes' infusion of this tea showed a proportion of caffeine to tannin of 1 to 3 (caffeine 2.7 per cent., and tannin 8.0 per cent.), and when this result is obtained by chemical analysis the tea proves invariably to be of a good dietetic character, free from excess of tannin and from excess of caffeine. The alkaloid, in fact, is presented in the form of a neutral tannate. We have received a further sample which is described as being of a still higher quality. We found that it produced an infusion (five minutes) smooth, soft, and delicate to the palate, and, again, analysis showed that the caffeine was present in the proportion of 1 to 3 of tannin. The conclusion seems to be confirmed that harsh, astringent or bitter teas owe their properties to, on the one hand, an excess of tannin present, or, on the other, to an excess of caffeine. The ratio is correct in the tea under examination, showing that in a five minutes' infusion caffeine-tannate is extracted, but neither free tannin nor caffeine. The result is a beverage that does not disturb the digestion.

### "SOOLID" NASO-PHARYNGEAL (EUCAINE) COMPOUND.

(BURROUGHS, WELLCOME, AND CO., SNOW HILL BUILDINGS, LONDON, E.C.)

This soloid is useful in the treatment, by a gargle or spray, of irritable conditions of the nose and throat. It contains, amongst other things, well-known antiseptic essential oils besides boric acid and sodium benzoate. The formula has been recently modified by replacing cocaine salt with eucaine hydrochloride. For the treatment of the nose and throat one soloid is dissolved in three ounces of water. A solution of two soloids in ten ounces of water has been found very useful as a lotion in conjunctivitis.

### "DIAL-CIBA."

(THE SACCHARIN CORPORATION, LIMITED, 36 AND 37, QUEEN-STREET, LONDON, E.C.)

The above is the short name given to an important barbituric acid derivative. It is, in fact, di-allyl barbituric acid or di-allyl malonyl urea. The ethyl group in veronal is replaced by the allyl group; this is said to give it important advantages. Thus whilst a powerful hypnotic, it is held to be less toxic and to produce no unpleasant after-effects. An interesting point in regard to its administration is that whereas diethyl barbituric acid is recoverable to a large extent from the urine as such, di-allyl barbituric acid breaks down into simpler bodies. These are important claims, and the new derivative is worth some attention. It furnishes an interesting example of the relation of chemical constitution to pharmacological action.

# THE LANCET.

LONDON: SATURDAY, JANUARY 6, 1917.

## An Ideal for the New Year.

THE New Year finds the medical man bearing his share of the war burden—a burden not exactly comparable to that borne by his fellow citizens. To every other man of military age, with but trifling exceptions, the call has come to train himself either to fight or to keep the fighting machine in full efficiency, his previous occupation having not necessarily been in any relation whatever to his new obligations. The call to arms takes little or no account of any man's particular talent or equipment, and, except in the case of the few who have obtained special duties because of their special aptitudes, there has been small attempt to make the military employment fit the civilian training. But the medical man has the privilege of being called upon by the State to serve his country by the exercise of the science and art in which he has been brought up; and, speaking generally, he can do this without further special education. Again, inasmuch as the State cannot afford to dispense with our normal activities for the public health, the medical profession is submitted not to the ordinary lay tribunal, but to the jurisdiction of a medical committee, who can appreciate the difficulties of the position and the force of any claims to exemption upon professional grounds. The medical man in time of war is doing for his country his own work and doing it in his own way.

But this work cannot be done without sacrifice and without hardship. The supreme sacrifice which a man can make has been made week by week by the officers of the Royal Army Medical Corps in company with their stretcher-bearers, as our pages and the war records of the different medical schools testify. But a sacrifice less dramatic than the loss of life, but in a sense hardly less complete, is daily being made by the doctor who gives up his professional life at the call of his country; he resigns all that the patient toil of his early years of practice has built up for him, and he does this with no chance of real security that he will be able to take up later what he lays down. Arrangements have indeed been made in many localities, good in themselves and more or less complete or incomplete; but at the best nothing can safeguard a position which depends upon personal interest and upon qualities of disposition and character, when these factors of success are removed from the scene. This sacrifice, which has been made by a large series of medical men since the outbreak of war, has been embittered in some cases by the feeling, right or wrong, that those remaining behind

have made capital or derived gain at the expense of the men who went. That absolute gain has been acquired comparable in any way to the vast profits which certain other sections of the community have been deriving from the war it is impossible to contend. But just as among the individual fighting units the contrast is a crying one between the man in the trenches exposed to hourly danger and terror, and his companion in the munition works living in comfort and safety under the admirable hygiene provided by a careful Government department, and earning enough to keep him in relative luxury—so in the medical profession there is the same contrast between the man who goes to the war and the man who stays behind. The latter is in every case the relative gainer in material things, and the knowledge is galling to all; for very many medical men who for public or private reasons of the most valid sort are remaining at their civil posts long ardently to share the harsher fate of their brethren.

One way only offers by which the inequality can be brought level. Identity of sacrifice for us all is an ideal which cannot be brought about by administrative action, but only by the willing co-operation of each member of a free society. The medical profession is a noble calling. If every member of the profession should now willingly and of his own initiative forgo any absolute war advantage, and, more than that, should try to arrange his life so that he gains no relative advantage over those who have joined the Navy or Army, this high estimate of our calling will be fully justified in the public eye. The reduction of his standard of living to something the level of that of his compeers at the front; the decision to make his work his best possible contribution, in the first instance to national service, and in the second to the welfare of his own profession: these measures will afford a solution to the problems which beset the situation, and which appear to divide the interests of the civilian medical service of the country from those of their brethren with the colours. No complete mobilisation of the medical profession will have been effected, whatever regulations are made, unless the idea of identical sacrifice is kept before us, and that is the level to which all should strive to rise.

## The Liquor Traffic and the Food Question.

THE increasing seriousness of the food problem in this country has raised afresh and in a more urgent form the question of the control of the liquor traffic in the interest of national efficiency. The advocates of more rigorous measures in restraint of drinking are now able to reinforce the arguments which they have been wont to base on the detrimental influence of alcoholic excess, by the further argument that the loss of energy-value involved in the conversion of the carbohydrate of grain and sugar into alcohol

represents in itself a serious leakage in our food-supplies, and one that should not be tolerated in a time of threatened shortage. There is, no doubt, a great deal of force in this argument, even though it may be rather less than is represented by some; and no one who examines the facts with an unbiassed mind will be concerned to deny that there is need of further restrictions on the manufacture and consumption of alcoholic beverages in this country. The only question about which there will be any difference of opinion is whether the policy to be pursued should be simply one of restriction, tentative and modifiable according to altering conditions, or whether recourse should be had at once to the drastic method of absolute prohibition of the sale of alcoholic liquors.

The policy of total prohibition has been very strenuously urged on the public attention of late, not only by recognised supporters of the extreme temperance position, but also by many business men and employers of labour, who, while not committed to any doctrinaire views on the alcohol question, are disposed to regard enforced teetotalism as desirable during the term of the war, both on grounds of food economy and as a salutary discipline. The arguments adduced in support of this policy are sufficiently cogent, and the influence and standing of its advocates sufficiently important, to ensure its respectful consideration; and it has moreover an attractive air of thoroughness and simplicity which can hardly fail to recommend it at a time when these qualities are held in such particular esteem. But, despite these recommendations, it may be questioned whether its results in actual practice would be entirely satisfactory—perhaps no one thinks that they would. It is tolerably certain that the enforcement of prohibition would be far from easy. And the difficulties might not be matters merely of popular emotion. One of the many points regarding the action of alcohol that might have been, but was not, studied in the days of peace is the effect on muscular and nervous energy when the habitual use of the drug is suddenly discontinued. Probably discontinuance has no detrimental effect, or at all events none of more than slight and transitory character; but, on the other hand, it is at least conceivable that men who for years have been accustomed to taking some form of alcoholic beverage as part of their diet after a hard day's labour, may be affected by its sudden and complete withdrawal. At the present moment several of the most vitally important industries in the country are relying very largely on the services of older and less robust men—men who have grown up in the use of alcohol; here a relatively small saving in food material would be dearly paid for by lessened activity. Allowance must be made in any regulations for the cases of those in whom abstinence produces ill-effects. There are other difficulties which the policy of prohibition would involve, and these are not remote as the case of those who suffer physically from abstinence may appear to be. Foremost amongst these is the

probable development of an illicit traffic in alcohol and in substitutes for alcohol which may be still more detrimental to public health and order. The experience of Russia during the present war is eloquent on this point. In that country the complete and abrupt prohibition of the sale of vodka—practically the only alcoholic beverage in popular use—while it undoubtedly has had excellent results in many directions, has at the same time produced a very serious extension of secret drinking, especially where an excess of local zeal has also prohibited the sale of other and less objectionable alcoholic liquors. Methylated spirit, varnish, and lacquer are amongst the substitutes for vodka which are stated to have been used, and the resulting cases of death or of complete or partial blindness have been extremely numerous. This evil would not be likely to attain to grave development in the case of our own population, but we know enough to see that it must not be ignored. And in this connexion it is, perhaps, significant that in Germany, though the food difficulty has long since reached a degree of urgency, it has not been judged necessary or expedient to adopt the policy of prohibiting the sale of beer, though the supply of materials to the brewer is already under limitation.

The alternative to prohibition is to impose restrictions on the consumption of ardent liquors, and to diminish also the amount of grain and sugar used in their production. The work of the Liquor Control Board has shown how much can be done in both these directions; the effect of their regulations in decreasing drunkenness and alcoholic disease, as measured by the most characteristic manifestation of alcoholism, delirium tremens, has been generally ascribed to the influence of the restricted hours during which public-houses may be opened, and this is unquestionably the main factor in the result; but it is probable that an important part has also been played by the action of the Board in enforcing the dilution of spirits, and in endeavouring to create a popular taste for a very low gravity beer. Apart from its beneficial influence on the public health, the introduction of weaker beers will, of course, involve a considerable saving in the use of food substances; it has been estimated that an all-round reduction of the specific gravity by 10 degrees would decrease the quantity of materials used by close on 20 per cent. Combined with further limitations on the amounts of beer and spirits to be released for consumption, a reform on these lines would go some way to meet the argument for prohibition which has been based on the present need for economy in the use of foodstuffs. Of course, such a policy would have to be general in its application, and, as a large elasticity in adjustment to varying conditions is of its essence, it could hardly be carried out except by a central organisation entirely untrammelled by considerations of trading interest. The most effective way in which these requirements can be fulfilled is obviously under a system of State ownership, and we are glad to note that the immediate establishment

of such a system has apparently been decided upon by the new Government, presumably on the lines adumbrated by Mr. LLOYD GEORGE when he urged the adoption of this policy in the early part of last year. State purchase has long been recognised by all social reformers of reasonable views as a practicable solution of many of the evils of the drink traffic.

### Welfare Work in Factories.

THE Welfare Department of the Ministry of Munitions carries out the recommendations of the Health of Munition Workers Committee. With these recommendations we have dealt as they appeared. The primary concern, naturally, of most departments of the Ministry of Munitions is output, which blossoms freely under an official routine, but welfare work is a tender plant which grows by kindness and suasion and withers in an atmosphere of official compulsion. Its chief sphere of action at the present time is to deal with the conditions of life generally among vast numbers of young women introduced—pitchforked one may almost say—by the acute need of labour into the engineering industry. The material of which the worker in munitions is composed, referring now to the female workers, has peculiar attributes and needs special treatment. The treatment is placed in the hands of a welfare supervisor, and the difficulty begins with the choice of a suitable person. It is no good for a welfare supervisor to be a sort of superior fore-woman. This only produces envy and irritation. She must manage the employees through her superior knowledge of life and have the quiet authority of position, while actually being willing to minister to their smallest needs. The ideal combination is probably that of supervisor with first-aid nurse. Where large numbers of young women are employed a constant stream of small distempers and accidents find their way out of the workroom. If referred to the male foreman the operatives will necessarily be excused and sent home, with harm to themselves and their work, inasmuch as a series of delicate operations may be checked for the day by the loss of a worker, and the girl herself loses her good record for punctual attendance and has a passing ailment magnified into a day's illness. Referred, on the other hand, to the welfare supervisor for advice and encouragement, the girl may be able, without harm, to return to her work after a short time of rest. The supervisor has at the same time gained her confidence, making the operative feel that she is an individual in whom personal interest is taken, while with this reputation among her charges the supervisor can soon do anything she pleases with them. Here is a field of immeasurable usefulness for the educated woman of leisure and tact, whether she has been recently trained in social work or has passed the age of family cares whilst retaining the motherly instinct necessary. It is social work at the fountain head.

What is the clear result to-day of properly conducted welfare work among female operatives? Not merely that the female operative

can give nine hours' work, exclusive of meal times, day or night without obvious harm; but that such work done under fitting conditions may result in an improvement of the physique of the town-dweller which will spell permanent benefit to the race. The woman munition-worker is in the direct road to become healthy, clean, and well-mannered. The health is due to the well-ventilated atmosphere in which she now works, to the good meals at regular hours with proper intervals of rest and recreation. In addition to all this her physique is in no little degree benefitted by keenness on the work which is often attractive in itself, for metal turnings are beautiful. Health and keenness react the one on the other. Cleanliness is at first a matter of industrial necessity; overalls and caps must be worn to protect flying garments and hair from the risk of catching in machinery; hot water and carbolic soap, followed by a suitable unguent, are enjoined to avoid dermatitis from handling irritating substances. But these practices lead to a love of cleanliness for its own sake and to the observation that a clean, washable uniform is becoming. Improvement of manners commences as an official necessity; larking is dangerous and has to be forbidden on account of its danger. But the growing interest in the work and in other subjects which a welfare supervisor can tactfully suggest ends by taking the place of any desire for practical joking, as well as of the grumbling at food which is, in all ranks of society, largely a question of mental unoccupation.

In the light of these results we must revise the accepted notions upon the effect of prolonged labour on the health of women workers. In the engineering industry the efficiency of female labour is a discovery, and although in certain large factories up and down the country welfare work has been carried out as a routine for 20 years or more its effects have not been duly appraised. We must now recognise much factory employment as a healthy occupation for young women under proper conditions of atmosphere, rest, nutrition, and personal care, and this is a matter of first-class medical significance. The bad effect of industry on female health was owing to the fact that the surroundings were bad, and although this was quite well known to medical men, and admitted to some extent in the labour world, the public did not accept the facts. They did not believe that the work was largely good in itself, though the conditions under which it was done were often not good. The present experience seems to show that a large proportion of women can, without harm to their work or themselves, continue at it throughout the whole time of their physiological cycle, without requiring more than a little personal consideration of a kind which the welfare supervisor can impose. The moral, which will sometime become a pressing one, is that wholesome industrial conditions are the reasonable demand of workers—women as well as men—in peace as in war, and it will become a charge upon medical men to see that these conditions are forthcoming.

## Annotations.

"Ne quid nimis."

### THE GOVERNMENT LABORATORY AND THE WAR.

As might have been expected, the war has placed considerable pressure upon the time and energies of the Government laboratory officials, and this is well shown in the report for the year ended March 31st, 1916, of the Government chemist, Sir James J. Dobbie, which was issued last week. The samples of food examined in connexion with the supply of the Expeditionary Force alone numbered 8901, as compared with 1348 recorded in the previous report. The greater part of the work of the department is carried out at Clement's Inn and in the branch laboratory at the Custom House. Six of the branch stations for testing for revenue work have been closed temporarily during the war, but the total number of samples examined from all departments was 383,892. There was a large increase in the number of samples of export tobacco examined due to the despatch of tobacco for the use of the British Expeditionary Force. The number of certificates issued in connexion with these samples was 81,889, an increase of no less than 48,179 over the corresponding period of last year. The food-supplies examined for the War Department included Army biscuits, flour, bread, pearl-barley, oatmeal, arrowroot, sago, and tapioca, desiccated potatoes and other vegetables, condensed and fresh milk, cocoa, jam, and meat extracts and essences, pepper, calf's-foot jelly powders, mustard, hops, malt, and beer, tinned meats and fish, soup powders, butter, sugar, and cheese. Tender samples were examined as to conformity with the specification, and bulk deliveries to ascertain whether they compared satisfactorily with the selected tender samples. In this direction more than 6000 samples were taken from contractors' deliveries in course of transit to the Expeditionary Forces. This system of control has, no doubt, effected considerable economies. The work now carried out at the Government laboratories is of great service to the nation and is of a much more comprehensive character than it was in the old time, when the Somerset House laboratories were practically exclusively devoted to questions of revenue and excise.

### STAPHYLOCOCCIC MENINGITIS.

AN interesting case of cerebro-spinal meningitis due to the *Staphylococcus pyogenes albus* is reported in the *Archives de Médecine et Pharmacie Navale*s for September by Dr. H. Bourges, médecin de 1<sup>e</sup> classe (staff-surgeon) in the French Navy. This case had a happier ending than most, for all the other similar cases quoted from the literature proved fatal, and Dr. Bourges ascribes the recovery of this patient to an artificial abscess he provoked by the method of Fochier—i.e., by the subcutaneous injection of sterile turpentine. The patient, a sailor, was suddenly attacked on Dec. 10th, 1913, when on sentry duty, with violent frontal headache, pains along the spine, weakness, and vomiting; his temperature was 103° F. When he reached hospital on the 11th a lumbar puncture removed 30 c.c. of fluid, and 20 c.c. of antimeningococcus serum was injected. As this injection produced no benefit it was never repeated. The fluid withdrawn contained

no meningococci, only Gram-positive cocci and diplococci. On the 12th lumbar puncture was repeated and the patient began to improve, but on the 18th he relapsed, with severe frontal headache, pain along the spine, stiff neck, temperature 104°, but pulse only 80, insomnia, and daily loss of weight. He was having ice to his head and a warm bath every four hours, a collargol enema, and daily intravenous injections of electrargol. The sputum was examined for tubercle bacilli and pneumococci without result, but from the fluid of a third lumbar puncture the *Staphylococcus pyogenes albus* was grown. The temperature continued steadily at the same high level, the general condition persisted, and a fourth lumbar puncture on Dec. 29th showed that the cerebro-spinal fluid was purulent, the cells mainly polymorphonuclears, and it was decided to provoke a fixation abscess by the method of Fochier. Accordingly 1 c.c. of turpentine was injected into the cellular tissue of the left thigh. Conditions improved at once and the temperature fell next day to 100° as the local inflammation developed. On Feb. 3rd the abscess was opened and many Gram-positive cocci were seen in the pus, from which also *Staphylococcus pyogenes albus* was recovered. The general condition rapidly improved, the patient could sleep, and "imperiously demanded food." By the 6th he had gained 10 lb. in weight, and all was going well when, on the 9th, he again relapsed. This time the fifth lumbar puncture showed a fluid clear and under slight pressure, with lymphocytes as the predominant cells. After this lumbar puncture he immediately improved, but suffered from slight post-febrile insanity for a time, ultimately being discharged cured, but still weak, after a little more than three months in hospital. Dr. Bourges considers the important points in the differential diagnosis of staphylococcal meningitis to be: the headache always frontal, the continuous pyrexia, the slower pulse, the more purulent cerebro-spinal fluid with blood in it and staphylococci. The fixation or artificial abscess is, he observes, useful in treating cases for which we have no antiserum. It acts first of all as a trap for microbes attracted into this new abscess, and probably also it stimulates additional formation of antibodies, thus increasing the bactericidal activity of the blood. It is, he thinks, of special advantage in staphylococcal or streptococcal infections.

### THE METROPOLITAN WATER-SUPPLY.

DURING the month of August, 1916, the rainfall (Thames basin) was 1'33 of an inch above the average mean rainfall for that month during the previous 33 years. The results of the chemical examination showed that all three raw Thames waters deteriorated or showed no change in quality, and the same was the case with the filtered waters. The quality compared favourably with the 1915 averages in both cases. Bacteriologically the raw Thames and New River waters contained fewer, and the raw Lee water more, bacteria than their respective averages, while the filtered waters yielded, generally speaking, not unsatisfactory results. In September the rainfall was 0'37 of an inch below the average mean rainfall for that month during the previous 33 years. Chemical examination showed that the raw Thames water improved slightly in quality according to the albuminoid test, but deteriorated as measured by the oxygen absorbed, turbidity, and colour tests. The filtered

waters showed a similar deterioration, including that shown by the albuminoid test. Both, however, showed results better than or equal to their respective averages in 1915. The raw Thames and Lee waters contained more, and the raw New River water fewer bacteria than their respective averages for the year 1915, while the filtered waters were satisfactory. In October the rainfall was 4·70 inches, or 1·48 inches above the average. Chemical examination in some respects showed a deterioration in regard to raw Thames and Lee waters, but an improvement in regard to raw New River water. There was also a certain deterioration shown in the filtered waters, but bacteriologically they were satisfactory, containing no typical *B. coli* even when 100 c.c. of the water were examined.

#### ANÆSTHESIA IN AMERICA.

THE publication of an American *Year Book of Anæsthesia and Analgesia* proves the interest which is expended in that country upon the study of anæsthetics, and affords also an index to the work done in the same direction. The editor, Dr. F. H. McMechan, explains that it had been intended to make the volume more international than it is, but we think that the loss of continental contributions is more than balanced by the gain of some peculiarly American features. Generally speaking, the most valuable and most striking portions of the book are those that deal, not so much with the practice of anæsthesia, as with its physiology and with the theories that endeavour to explain its causation and essential nature. Professor Ralph S. Lillie's thesis upon the physico-chemical theory of anæsthesia contains a well-reasoned discussion of current views, and puts forward excellent arguments for the belief that alterations in the physico-chemical properties of the plasma-membrane form the essential basis of anæsthesia. Whatever condition alters this structure so as to make it less capable of undergoing the changes of permeability and of electrical polarisation which normally accompany stimulation—and apparently other forms of cell activity—this condition has an inhibiting or paralysing effect on the cell. Professor Lillie's arguments supply an explanation of the action of all anæsthetic agents, and are therefore more inclusive than the views of Professor Benjamin Moore and Dr. H. E. Roaf which have hitherto received a large amount of attention and acquiescence. It is in the altered electrical conductivity of narcotised cells that Professor Lillie finds the most conclusive evidence of a decreased permeability during narcosis, pointing out that there appears to be a general relation between susceptibility to narcosis and the degree of organisation. Plants and lower organisms require higher concentrations of anæsthetic than higher animals; in vertebrates the cells most susceptible to narcosis are those of the higher brain centres. When organisation is destroyed many of the chemical processes of protoplasm, such as oxidations and fermentations, may continue and may be slowed by anæsthetics, but much higher concentrations of the latter are now necessary. This indicates that, when anæsthetics influence oxidative and other metabolic processes within the cell, they do so not directly, but through their influence upon some specially sensitive intermediary, which is a part of the organised structure

of the cell and itself controls the rate of the intra-cellular chemical processes. Thus Professor Lillie's arguments and facts appear to justify a conception of anaesthesia wider than that which was pictured by the statements of Professor Moore and Dr. Roaf. Other papers in the volume deal with blood changes under anaesthesia and with the origin of shock, with circulatory disturbances due to laparotomy, posture, and anaesthesia, and with blood pressure under anaesthesia. In addition there are articles describing work which is already well known, such as that of Dr. Wilfred Harris on injection of the Gasserian ganglion for trigeminal neuralgia and of Dr. Goodman Levy upon ventricular fibrillation. The editor contributes a profusely illustrated account of nasal administration of nitrous oxide; articles of a practical nature upon colonic ether-oil anaesthesia, upon delayed chloroform poisoning, and upon other and more unusual subjects, such as "The Use of Music during Anaesthesia," and "Some Psychic Factors of Anaesthesia," fill a volume which we hope will prove the first of a valuable series.

#### EXPERIMENTAL ATTEMPTS TO TRANSMIT PELLAGRA.

THE causation of pellagra is still enshrouded in doubt, investigators of the malady being at present divided mainly into two opposing parties, one attributing its origin to a specific infection, the other classing it as a dietary disease due to a deficiency of some essential substance or a want of balance in the staple articles of diet. The combat between these two opposing camps is more active in America than at home, the first hypothesis being supported by the Thompson-MacFadden Pellagra Commission of the New York Post-Graduate School, while the second finds a strenuous upholder in Dr. Joseph Goldberger, of the United States Public Health Service, who has for some time been specially investigating the malady. This expert has already published details (see THE LANCET of Jan. 8th, 1916) of the experimental production of pellagra by the continued use of a deficient or ill-assorted diet among some convicts in an American penitentiary who had volunteered to submit themselves for the test. In continuation of his observations he has undertaken a fresh series of experiments, the results of which have been recently published in the *United States Public Health Reports*. Assuming that if a specific infection existed it would probably be found either in the blood, the naso-pharyngeal secretions, the skin lesions, or in the excreta, Dr. Goldberger made attempts to transmit the malady by (1) the intramuscular or subcutaneous injection of blood, 5 to 7 c.c., from a sufferer into the system of healthy individuals; (2) the application of the pellagrins' naso-pharyngeal discharges by a swab to the healthy mucous membrane of the nose and naso-pharynx of the subjects of experiment; (3) the administration by the mouth of epidermic scales, up to 4 milligrammes, scraped from the pellagrous lesions of the skin; and (4) the ingestion of excreta—namely, urine up to 6 c.c., and faeces up to 8 grammes—from pellagrous cases by healthy persons. It may be explained that the scales, urine, and faeces were given in the form of pills, the material being mixed with bread or biscuit-crumbs and flour made into a pilular mass. The original number of persons who volunteered to submit to these extremely revolting experiments

was 20, of whom 13 were medical men, their ages ranging between 26 and 42 years, but it was found possible only to make use of 16 of them. The material for the tests was obtained from 17 pellagra patients of varying types and of different degrees of severity. The experiments were begun towards the end of last April and were continued to the end of June, so that a period of from four and a half to seven and a half months has elapsed since their initiation, long enough, it is thought, to enable a definite statement of the results to be made. Blood was furnished by 4 pellagrous persons, naso-pharyngeal discharges by 4, epidermal scales by 5, and urine and faeces by 16. Up to the date of report, early in November, not a single individual of those experimented upon developed any evidence to justify a diagnosis of pellagra, although, as might have been expected from the nature of the material swallowed, some four or five had immediate, but only temporary, gastro-intestinal disturbance. It would therefore appear that while the opinion that this disease is a communicable one gains no support from these experiments, the conclusion elsewhere drawn by Dr. Goldberger that it is an affection essentially of dietary origin brought about by a faulty, probably deficient, diet is materially strengthened.

#### UVEOPAROTID FEVER.

IN 1909 Heerfordt described by the name uveoparotid fever a new variety of infectious disease characterised by chronic inflammation of the parotid gland and of the uvea. His three patients each had bilateral parotid swelling and bilateral iridocyclitis, and two of them developed paralysis of a facial nerve in addition. The parotid swellings lasted for from 2 to 13 weeks, and so Heerfordt concluded that he was not dealing with cases of mumps; in addition, inquiry failed to show that his patients had been exposed to this infection, as no cases of epidemic parotitis in their neighbourhood could be heard of. He was able to find in the literature only two similar instances of this very chronic infection of the parotid glands and uveal tract, combined with facial paralysis. Dr. H. W. Leeksma, of Heukelum, has recently described<sup>1</sup> another instance of the disease. The patient, a married woman aged 28, felt tired early in January, and had cold shivers and night sweats, and in a few days' time had attacks of dizziness. On Jan. 21st she had pain in the left ear; on Feb. 2nd Dr. Leeksma found she had a right-sided Bell's palsy. On Feb. 8th the left parotid gland became swollen and painful. The Bell's palsy had cleared up by Feb. 21st, but two days later herpes of the left cornea occurred, and was followed by iridocyclitis. On March 3rd the right parotid gland swelled up, and on March 5th the right eye exhibited the signs of iridocyclitis. On April 10th a roseolous eruption appeared on the legs and remained for a fortnight. By April 25th the parotid swellings had vanished, and the iridocyclitis had improved in both eyes, though synchiae had appeared. On June 20th the affection of the left eye became suddenly worse, and the left parotid region was very painful. In August it was necessary to take the patient into an eye hospital for treatment. Dr. Leeksma found three typical cases of mumps occurring in the patient's environment in the month of February. He remarks that both iridocyclitis and facial paralysis are known to occur, though but

rarely, as complications of epidemic parotitis. He adds that the facial paralysis in the case he describes preceded the swelling of the parotid gland, and so cannot be attributed to the influence of mechanical pressure. He comes to the conclusion that Heerfordt's uveoparotid fever is nothing more or less than atypical mumps, and is not a new morbid entity. It should be added that the von Pirquet and Wassermann reactions in Dr. Leeksma's patient both proved negative.

#### THE TERCENTENARY OF BARTHOLIN.

Thomas Bartholinus, born Oct. 20th, 1616, died Dec. 4th, 1680, was one of Denmark's most famous men of science, and his tercentenary is celebrated by the October issue of *Janus*, which is given over to a record of his life and works. He was born in Copenhagen, the son of a well-known University professor. After a course of study at the Copenhagen University he went abroad to study at the age of 21. It is interesting to note that this period of travel and learning occupied ten years. All the while, it is said, he studied and wrote with the greatest diligence. He returned to Copenhagen and was appointed to the chair of anatomy. At the early age of 44 he moved to his estate and lived afterwards in peaceful retirement, so that he made all his important discoveries during the short space of 14 years. Bartholin's claim to fame rests upon his discovery of the thoracic duct and the lymphatic system in man. A man, tranquil in temperament and capable of enjoying to the full the social glamour and fame he rapidly gained, it is said that he often wished he had never found the small, scarcely visible lymphatic vessels, because of all the strife, controversy, and annoyances associated with their discovery. Bartholinus lived in ample and generous days, when distinction in one sphere of life did not preclude honour in other walks, for besides occupying various public offices he was also a judge of the Supreme Court. It was his son, Caspar Bartholinus, who discovered the glands, called after his name, in the vagina, and the ductus Bartholinianus. He, like his father, appears to have early given up scientific work. He entered the Civil Service and gained a patent of nobility which was conferred not only upon him but reverted back to his father, who had been dead for 50 years.

#### THE LANCET, VOL. II., 1916 : THE INDEX.

THE Index and Title-page to the volume of THE LANCET completed with the issue of Dec. 30th will be ready early in the New Year. Owing to the continued shortage in the paper-supply, the Index will not be issued with all copies of THE LANCET, as was the custom prior to the War. Subscribers who bind up their numbers are requested to send a post-card to the Manager, THE LANCET Office, 423, Strand, London, W.C., when a copy of the Index and Title-page will be supplied free of charge.

Dr. E. Coey Bigger has been appointed a Commissioner of the Irish Local Government Board in the room of Sir Thomas Stafford, who has resigned. Dr. Bigger is one of the inspectors of the Board, and was a member of the Vice-Regal Committee on the Poor Law whose far-reaching report attracted great attention some ten years ago.

<sup>1</sup> Nederl. Tijdschr. v. Geneeskunde, Amsterdam, 1916, II., 1126.

## DENTIFRICES.

**M**ODERN dentifrices may be divided broadly into four groups: (1) Powders, (2) pastes, (3) solid soaps, and (4) fluids. The demand of the public appears to be in favour of powders, pastes, and soaps, the presence of a mechanical agent in these being appreciated while such is usually omitted from fluid preparations. Of 19 samples of dentifrices which we recently purchased in the open market seven were powders, eight were pastes, two were solid soaps, and two were clear fluids. Many formulas of dentifrices have been published from time to time, and in most cases the design appears to aim at securing the combined offices of a germicide, antifermenative, deodorant, antacid, and a mechanical detergent. Such a combination presents no difficulty in the making, but it is important that the materials chosen should be carefully prepared and blended and free from injurious constituents, and that the whole result should be attractive. It is the invasion of the enamel by disease organisms which begins in many cases the degradation of the tooth, and the process of decay, unless arrested, leads eventually to that exquisite trouble so widely experienced. This has led to the policy of maintaining mouth asepsis, the careful cleansing of the teeth being now put into very general practice by the daily use of the tooth-brush and a dentifrice. A dentifrice may clearly do more harm than good if it is carelessly prepared or contains inappropriate constituents, and its choice is therefore important.

According to THE LANCET Laboratory examination a constituent common in dentifrices is chalk, and as an antacid it has claims, but it possesses no germicidal or antifermenative properties, and though serving as an effective mechanical detergent may, unless it is a finely triturated preparation, injure the enamel by erosive action. It should, in other words, be free from gritty particles which are likely to scratch. Other mechanical detergents are employed, as, for example, silicious substances like kieselguhr and talc, which, however, have no acid-neutralising properties and may contain particles capable of producing injury to the enamel. A finely comminuted mechanical detergent containing an effective antiseptic seems desirable, but it is extremely important that this detergent should be perfectly smooth and free from gritty particles. The removal from the cavities of the teeth of decaying particles of food which are readily

hydrolysed and fermentable is not always possible by the toothbrush alone, and it has been said on good authority that the chewing of coconut or even an apple acts as an effective scourer of the teeth with the free use of the wet brush afterwards.

Soap, again, is a very common constituent of dentifrices and is often associated with chalk. It serves, of course, as a cleanser and antacid and there can be little objection to its use. It also acts as an adjuvant favouring the formation of a uniform emulsion. Amongst other adjuvants or excipients used in dentifrices are glycerine and sometimes sugar.

Amongst the antiseptics chosen is a wide range of essential oils and aromatics, all of which possess more or less germicidal properties. Popular amongst these are thymol, carbolic acid, hydrogen peroxide, benzoic acid, wintergreen, and the mint oils. Cinnamon also is a favourite, and it is known to have valuable antiseptic properties.

These generalities considered, we may pass to the actual results of our examination of a number of dentifrices which fairly represent the kind in public use at the present time. We deal with them in the order already set out, which is as follows: (1) Dry powders; (2) pastes; (3) solid soaps; and (4) fluids.

(1) *Dry powders*.—As will be seen from the accompanying table, these all contained chalk (mostly represented in an insoluble ash effervescing in acids) in prominent quantity, the percentage amount lying between 32·33 and 88·12. In many cases the chalk was not finely comminuted, as an inspection of the table will show. With two exceptions soap was present and an antiseptic, such as phenol and thymol, and essential oils, of which eucalyptus appeared to be in favour. One contained a decided amount of sugar and in others starch granules, the desirability of which is doubtful. In two instances the powders were found to yield available oxygen on suitable treatment. These preparations would probably have a slight bleaching effect on the teeth. Most of the powders were agreeably perfumed, and in certain cases orris root was a considerable constituent.

(2) *Pastes*.—The pastes showed, generally speaking, a wider range of composition than the other preparations examined. The substances found included chalk, sugar, soap, starch granules, silica, areca, and germicidal substances, amongst which were benzoic acid, wintergreen, thymol, mint, and other essential oils. In one case in which

## THE COMPOSITION OF DENTIFRICES.

Number of dentifrice.	Moisture.	Ash.	Insoluble ash (chiefly chalk).	Soluble alkali as Na <sub>2</sub> O.	Alcoholic extract (chiefly soap and glycerine).	Microscopical observations.	Antiseptic agents.	
POWDERS.	1	0·54	88·82	88·12	0·68	0·46	Uniformly sized chalk particles, with a few angular pieces ; starch present.	Aromatics.
	2	8·27	63·28	62·66	0·64	3·20	Uniformly sized chalk particles, but not well levigated ; starch present.	Phenols.
	3	7·15	38·00	32·33	3·25	2·40	Starch granules, fine chalk particles, but not uniformly distributed.	Aromatics.
	4	1·50	82·00	77·50	3·96	3·00	Well-levigated, uniformly sized chalk particles, quite non-gritty.	Essential oils, peppermint.
	5	Nil.	71·20	66·43	4·23	10·40	Well-communited chalk, with starch granules, non-gritty.	Wintergreen.
	6	3·50	59·50	47·91	1·40	4·40	Fine, smooth chalk particles, non-gritty.	Clove, essential oils, available oxygen.
	7	3·20	64·90	60·99	3·38	16·04	A finely comminuted powder, free from irregular particles.	Oxygen and thymol.
PASTES.	8	2·00	11·80	11·20 (silica)	0·53	36·84	Irregular sized mineral particles, with starch granules.	Aromatics.
	9	32·75	33·00	29·13	3·44	34·20	Smooth and well-communited chalk quite free from gritty particles.	Peppermint, thymol.
	10	26·31	21·44	14·74	5·91	42·64	Particles irregular in size, comminution not good.	Thymol, wintergreen.
	11	14·62	13·21	11·16	1·37	51·44	Starch granules and a few irregular mineral particles.	Aromatics.
	12	26·62	21·12	16·98	3·67	53·36	Contained a well-communited powder, perfectly smooth and free from grit or irregularities.	Benzoic and essential oils, peppermint, &c.
	13	18·58	32·43	20·20	10·80	35·44	Irregular particles ; the chalk not sufficiently comminuted ; some starch.	Essential oils.
	14	23·10	36·58	36·04	0·47	32·00	Very fine and smooth chalk particles well comminuted.	Menthol.
SOAP.	15	20·35	19·32	18·61	0·60	51·64	Somewhat coarse particles, showing defective levigation ; some starch.	Thymol, eucalyptus.
	16	5·60	35·70	22·98	11·20	71·42	Good round particles of chalk, but capable of further levigation.	Aromatics, essential oils.
	17	4·89	28·44	13·86	12·20	81·25	Good smooth and regularly sized chalk powder present.	Essential oils, perfume.
FLUIDS.	18	99·83 (alcoholic)	Nil.	—	—	—	Clear fluid.	Essential oils, menthol.
	19	72·02 (alcoholic)	1·63	Nil.	1·40	27·98	Clear fluid.	Aromatic and essential oils.

thymol was used the preparation had a rather sharp, stinging effect on the tongue. On the whole the chalk present in these pastes was in a much better state of comminution than in the dry powders. In this respect some were decidedly superior to others. As the microscope showed, the mechanical detergent was here and there crude, presenting irregularly sized and gritty particles likely to damage in the long run the enamel of the teeth. It is most desirable that chalk and kindred mechanical agents should be very finely triturated. Where this was the case the dentifrices were excellent in their effect and very agreeable to use. The presence of sugar, both cane and glucose, may be open to objection, and it is probable that these substances have recently replaced glycerine owing to the restrictions on the supply caused by the extensive use of this substance for war purposes. Another hydrolysable carbohydrate, starch, does not appear to be a desirable ingredient of a dentifrice.

(3) *Soap dentifrices.*—Soap tablets for purposes of cleansing the teeth are commonly combined with some chalk or phenol or essential oils. The oils are generally of the character of perfumes, and cinnamon seems useful. On the whole, the chalk in these preparations was fairly well comminuted, but some specimens might well be improved in this respect.

(4) *Fluid dentifrices.*—These consisted generally of a solution of essential oils in spirit. When added to water a milky fluid results, which, however, can possess little if any mechanical detergent action to speak of. In one case there was also dissolved in the spirit some soap.

In conclusion, we do not pretend to have exhausted the subject, but we think that sufficient information has been obtained in the course of the inquiry to show the chief points in regard to the composition and character of the dentifrices which find public patronage.

## THE CONTROL OF VENEREAL DISEASES.

### *Scheme for the City of London.*

THE City Corporation has recently approved a scheme for the treatment of venereal diseases, and the work will be carried out in conjunction with the authorities of St. Bartholomew's Hospital. A special centre will be established in a building erected several years ago by the Corporation for use as a hospital. Here will be held a clinic at which will be treated cases in the communicable stage, and, in addition, at least ten beds will be available for in-patient treatment. Other beds, as may be found necessary, will be provided in the hospital. Adequate provision for teaching and demonstration purposes has been arranged. The hospital authorities will be responsible for the administration and staffing of the centre. In addition to the necessary nursing and general assistance, the work will be in charge of a member of the hospital staff, assisted by a senior whole-time medical officer. A new junior appointment will be created at the hospital, and this medical officer will divide his time between the work in the skin department and the new department. The entire resources of the hospital, as in the case of the tuberculosis dispensary, will be available for assistance in special cases. The simpler bacteriological work will be done at the centre, but all investigations requiring special tests or cultural methods will be under the charge of the pathologist of the hospital and will be carried out in his laboratory. The usual provision of outfits for the forwarding of pathological specimens by medical practitioners, the free distribution of salvarsan, and arrangements for necessary consultations have been provided for. Dr. W. J. Howarth, medical officer of health of the City of London, will arrange to deliver lectures to the staffs of city firms and will be assisted by a woman doctor, who will lecture to women. It is proposed that St. Bartholomew's Hospital shall receive a sum of £1800 for the first year's work (not to include the cost of salvarsan). The necessary equipment and alterations will involve a capital expenditure, in addition, of about £1000.

At the same time as the scheme came up for consideration the Court of Common Council approved resolutions recording their opinion:—

(a) That administrative measures for the diagnosis and treatment of venereal diseases will only attain their maximum effectiveness in protecting the public health when the treatment of such diseases by unqualified persons is prevented by law.

(b) That it is desirable that the recommendation 58 (III.) of the Patent Medicines Committee of the House of Commons endorsed by the Royal Commission on Venereal Diseases, "That all advertisements of remedies for diseases arising from sexual intercourse or referring to sexual weakness be prohibited," should at once be carried out.

The following resolution was also passed by the Sanitary Committee:—

That it be referred to the medical officer of health to report, at the termination of six months, on the working of the scheme for the treatment of venereal diseases in the City, and to submit such information as may have been collected bearing on the desirability of compulsory notification and compulsory treatment of these diseases; and further to consider and report whether special legislative action is necessary to prevent persons suffering from venereal disease from engaging in occupations associated with the food-supply.

### *Early Experience of Statistical Notification in Western Australia.*

Dr. R. C. Everitt Atkinson, Commissioner of Public Health for Western Australia, sends us a report on the working of the first months of a scheme of confidential statistical notification of venereal diseases.<sup>1</sup> Forms of notification were sent to medical men early in June, and 70 have responded. Of the total of 563 cases reported up to Sept. 30th as "not previously under treatment for the present infection," 181 were of syphilis, an unusually high proportion probably explained by the much longer treatment required for syphilis than for gonorrhoea. In October the numbers of fresh notifications were: syphilis 33, gonorrhoea 91, chancroid 9. The Commissioner comments upon the flagrant disproportion between the numbers notified for the two sexes; whereas 155 cases of syphilis and 333 of gonorrhoea were notified in males, there were only 26 and 29 cases respectively notified in females. He concludes that females are much less inclined to seek medical advice, and states that the problem of dealing with the many cases of gonorrhoea in females not under medical treatment is receiving careful attention.

### *Routine Treatment of Venereal Diseases.*

At the request of the National Council for Combating Venereal Diseases a sketch of the routine treatment for venereal diseases as carried out at the military hospital in Rochester-row has been drawn up by Lieutenant-Colonel L. W. Harrison, the officer in charge. In the preface to this pamphlet of 14 pages Colonel Harrison states that there is no finality in the treatment of venereal diseases, and the outline is to be regarded simply as a bulletin of progress. Thus regarded, its appearance is timely, and the outline will serve a most useful purpose. The methods of treatment given are those which have stood the test of practice in the critical atmosphere of a teaching centre. The pamphlet is published by the National Council at Bank Buildings, Kingsway, London, W.C., price 2d. (post free 2½d.).

### *Treatment of Pregnant Women.*

The hospital accommodation for pregnant women is occupying the attention of the National Council for Combating Venereal Diseases. In consequence of the reluctance of the principal lying-in hospitals in London to receive such cases, many innocent sufferers have heretofore been compelled to enter Poor-law infirmaries if in need of institutional treatment. A recent conference between the National Council and the medical boards of these hospitals is likely to result in remedying this situation.

## CANADA.

(FROM OUR OWN CORRESPONDENT.)

### *Canadian Research Board.*

THE Federal Government has announced the creation of a National Scientific and Industrial Committee for Canada, and has indicated the programme to be carried out by the new body. For the direction of this work the whole time and service have been requisitioned of Professor A. B. MacCallum, F.R.S., professor of biochemistry in the University of Toronto, and President of the Royal Society of Canada. As chairman of a National Scientific and Industrial Committee, Professor MacCallum will bring to the discharge of his duties ripe experience and educational qualifications of the highest academical value. The first duty of the committee will be to outline plans and mature measures for scientific research which will later prove of benefit to the industrial interests of

the Dominion. Amongst some of the plans anticipated will be a scientific study of Canada's unused resources, the waste and by-products of farms, forest, fisheries, and industries. Trained and competent research men will be added to the staff as the work progresses, and the public are to be kept duly apprised of the results of the investigations.

#### *Pension and Discharge Boards.*

Mr. J. K. L. Ross, Montreal, has been appointed by the Federal Government chairman of the Canadian Permanent Pension Board. The medical member is Major J. L. Todd, associate professor of parasitology in McGill University. Major Todd made a careful study of pensions in England and France, and for a time served on the Pensions and Claims Board of England. Pensions will be awarded in direct proportion to the disability incurred, and disabled men discharged from the Canadian Army will be divided into six classes :—I., Total disability, 100 per cent.; II., Disability, 80 per cent.; III., Disability, 60 per cent.; IV., Disability, 40 per cent.; V., Disability, 20 per cent.; VI., Disability under 20 per cent. In the several military districts sub-boards are being appointed. The Military Hospitals Commission of Canada is appointing Discharge Boards to examine convalescent soldiers who are eligible for pensions. In Manitoba, Dr. H. H. Chown, Dr. Popham, and Dr. Galloway have been appointed, all of Winnipeg. In British Columbia, Dr. O. M. Jones and Dr. R. L. Fraser, Victoria, and Dr. W. J. C. Towlin. Lieutenant-Colonel Mackenzie Forbes has been appointed medical officer of the Hospitals Commission in Montreal.

#### *The Tuberculous Soldier in Canada.*

The Military Hospitals Commission of Canada is considering the problem of the tuberculous soldier when he arrives home from abroad, as well as the man who has enlisted for overseas service, but who was found to be tuberculous before being sent across the Atlantic. A committee of experts have advised the temporary treatment of these soldiers in existing sanatoria and the purchase of properties in localities suitable for the treatment of tuberculous cases. The western provinces have been provided for by the securing of the sanatorium at Frank, Alberta, which contains 120 beds. With the existing sanatoria at Tranquille (B.C.), Ninette (Manitoba), and Calgary, sufficient accommodation is available for Western Canada at present. The lower provinces will find accommodation partly in Quebec, St. John (N.B.), Kentville (N.S.), and Charlottetown (P.E.I.). In Ontario the Sir Oliver Mowat Institution at Kingston, and the Hamilton and London buildings have been secured. The two latter are to be materially enlarged by the joint aid of the Hospitals Commission, the Ontario Government, and the municipalities of Hamilton and London respectively.

#### *The Clayton Convalescent Home, Halifax, N.S.*

A convalescent home—the first of its kind—was recently opened in Halifax (N.S.) for the education, vocational, and physical training of disabled soldiers. Although such training is now in progress in other institutions of Canada, this is the first devoted exclusively to the work. The founder, Mr. W. J. Clayton, Halifax, has presented it to the Hospitals Commission. Provision has been made for instruction in cobbling, tailoring, and automobile driving. Arrangements are in progress for other trades. The first soldiers to be admitted were 17 from Jamaica who suffered from frost-bite last winter while on a transport going to England, necessitating the amputation of one or both feet.

#### *Infantile Paralysis in Ontario.*

The Ontario Board of Health are meeting with success in the prompt steps taken for combating infantile paralysis. In September there were 76 cases in the province with 7 deaths, while in October there were 31 cases with 7 deaths. The cases in October were scattered over 17 counties without concentration in any particular locality.

#### *The Problem of the Feeble-minded in Toronto.*

A recent session of the Public Health Section of the Academy of Medicine, Toronto, was devoted to a symposium on the subject of the feeble-minded in Toronto, which was opened by Dr. Clair M. Hincks, the present head in succession to the founder, Dr. Charles K. Clarke, of the Psychiatric Clinic, at the Toronto General Hospital. Dr. Hincks related the results of an investigation lasting over two and a half years and dealing with 1445 examinations. 50 per cent. of the feeble-minded cases

examined were known to be criminals and 285 of them habitual thieves, all of whom were still at large in the city. Fifty-nine people examined expressed a delight in burning down buildings and 120 admitted to murderous intentions; these also were still roaming the streets. 60 per cent. of all the social victims on the streets were stated to be feeble-minded. There were also examined 201 feeble-minded school-children regarded as absolutely incorrigible, 53 being sexually abnormal; they were still mixing with the normal children of the schools. These facts, the speaker said, were of the most pressing interest to the municipal and provincial educational authorities. Dr. Clarke agreed with the speaker that the problem of the feeble-minded must be forced upon the attention of the authorities, and no longer be allowed to fall between the provincial and the municipal bodies. The meeting passed a resolution in favour of increased institutional care for the mentally defective at the earliest possible date.

Dec. 13th, 1916.

#### PARIS.

(FROM OUR OWN CORRESPONDENT.)

#### *Infant Welfare in Paris during the Second Year of War.*

Professor Pinard recently made a communication to the Academy of Medicine on the protection of infant life in Paris during the second year of war. With protective measures similar to those of the preceding year, the figures of the second year are nevertheless not so good. At 95 per cent. of the 26,179 registered births the Assistance Publique rendered aid. The percentage of stillbirths rose from 6.6 to 7.7; the proportion of infants put out to nurse from 13 to 22 per cent.; the maternal mortality from 0.46 to 0.48 per cent. The greater number of abandoned infants (5.2 instead of 2.9 per cent.) and of premature births, and the diminution of the average weight at birth, all these are attributed to economic causes which M. Pinard vigorously denounces—namely, the presence in munition works of pregnant and nursing women. He demands the exclusion from the factory of both these classes, as well as the woman who has been delivered less than six months. To this drastic remedy M. Strauss took exception in view of the stern necessity of the war, and upon his suggestion discussion on M. Pinard's communication was postponed until a later meeting.

#### *The Excellent Sanitary State of Paris.*

M. Deslandres, a municipal councillor, has drawn up for his colleagues an important report on the working of the vaccination service from the beginning of hostilities. He states that during 28 months of warfare there have been registered in Paris a grand total of 3 cases of variola, 3 cases of varioloid, with a single death. The last case was noted on Dec. 15th, 1915, and the year 1916 has been unique in the statistics in having to its credit no single case of either variola or varioloid. These results are the outcome of the zeal of M. Guilhand who directs the vaccination service. For the first time in history a war on French territory has been unaccompanied by an outbreak of small-pox.

#### *Treatment of Gunshot Wounds with Ointments.*

M. Paul Gibbon recommends a reversion to the old treatment of wounds by the employment of ointment, confining its use to the long suppurative tracks produced by shell explosion. After opening up the wound he applies an ointment consisting of : aristol and dermatol in 1:5, salol 6, lanolin 30, and vaseline 30 parts. The dressing is changed every 2-4 days. He reports the relief of pain as almost immediate and a surprising rapidity in the process of healing.

#### *Antisyphilitic Measures in Morocco.*

These have recently been the subject of an important communication by Dr. Leredde to the Paris Society of Medicine. Syphilis is universal among the native population of Morocco and spreads widely from it to the army and the European population. The measures taken by the Service de Santé have aimed at sterilisation, particularly in the soldier, during the initial period by means of modern methods and eliminating by early preventive treatment the later manifestations of the disease. Soldiers with a chancre of whatever nature are directed to the subdivisional ambulance,

and, if the spirochete is demonstrated by microscopical examination, energetic treatment at once follows. Treatment centres and laboratories have been set up in the principal towns in Morocco for dealing with civilian disease. Lastly, measures have been taken to divide the prostitute into three classes: non-syphilitic, infectious syphilitic, and non-infectious tertiary. In the second class energetic antisyphilitic treatment is applied. These measures, initiated by General Lyantey and ably organised by Dr. Leredde, are the first serious attempt to deal with the evil in Morocco, and good results are to be looked for.

#### *The Action of Picric Acid on Blue Pus.*

Blue pus has been frequent in the course of healing wounds at base hospitals, especially where fistulae have been present leading down to bone—e.g., resections, osteomyelitis, purulent pleurisy. The antiseptics usually employed—alcohol, iodine, formalin—are toxic, tend to produce or keep up a dermatitis, and kill the newly formed tissue cells. At an Army Medical reunion at the Beauvais centre, Dr. Chazairain showed that 1 per cent. picric acid solution causes a rapid disappearance of blue pus without fear of general or hepatic toxic action and stimulates at the same time the active replacement of epidermic cells.

Jan. 1st.

## VITAL STATISTICS.

### HEALTH OF ENGLISH TOWNS.

In the 96 English and Welsh towns with populations exceeding 50,000 persons at the last Census 6599 births and 7863 deaths were registered during the week ended Saturday, Dec. 23rd, 1916. The annual rate of mortality, which had steadily increased from 13·0 to 20·3 per 1000 in the five preceding weeks, further rose in the week under notice to 23·7 per 1000 of their aggregate civil population estimated at 17,312,255 persons for the year 1915. During the first 12 weeks of the quarter just ended the mean annual death-rate in these towns averaged 15·1, against a corresponding rate of 15·6 per 1000 in London. Among the several towns the death-rate during the week ranged from 9·4 in Lincoln, 12·4 in Barnsley, 13·5 in Ilford, 14·3 in Rhondda, and 14·4 in Smethwick, to 35·0 in Oxford, 34·8 in Southport, 35·1 in Hastings, and 39·7 in Bournemouth.

The 7863 deaths from all causes were 1138 in excess of the number in the previous week, and included 236 which were referred to the principal epidemic diseases, against 226 and 230 in the two preceding weeks. Of these 236 deaths, 83 resulted from measles, 63 from infantile diarrhoeal diseases, 53 from diphtheria, 19 from whooping-cough, 10 from scarlet fever, and 8 from enteric fever, but not one from small-pox. The annual death-rate from these diseases was equal to 0·7 per 1000, and corresponded to that recorded in each of the three preceding weeks. The deaths attributed to measles, which had been 47, 56, and 50 in the three preceding weeks, rose to 83, and included 31 in London, 8 in Coventry, 7 in Manchester, 6 each in Birmingham and Liverpool, 5 in Edmonton, and 3 in Warrington. The deaths of infants (under 2 years) from diarrhoea and enteritis, which had declined from 477 to 82 in the 14 preceding weeks, further fell to 63, of which 14 were registered in London, 7 in Manchester, 6 in Birmingham, and 3 each in Stoke-on-Trent, Liverpool, Leeds, and Rhondda. The fatal cases of diphtheria, which had been 50, 47, and 61 in the three preceding weeks, fell to 53, and included 11 in London, 5 in Stoke-on-Trent, and 4 each in Birmingham and Manchester. The deaths attributed to whooping-cough, which had been 16, 23, and 18 in the three preceding weeks, numbered 19, of which 4 occurred in London and 3 in Bristol. The deaths referred to scarlet fever, which had increased from 6 to 12 in the four preceding weeks, fell to 10, and included 2 each in London and Manchester. The 8 cases of enteric fever were slightly below the average in the earlier weeks of the quarter, and included 2 each in London and Nottingham.

The number of scarlet fever patients under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, which had declined from 1171 to 1012 in the six preceding weeks, further fell to 922 on Saturday, Dec. 23rd; 100 new cases were admitted during the week, against 120, 103, and 100 in the three preceding weeks. The cases of diphtheria numbered 1445, against numbers declining from 1584 to 1473 in the four preceding weeks; 136 new cases were admitted during the week, against 171, 169, and 158 in the three preceding weeks. The 223 deaths from all causes in London were 222 in excess of the number recorded in the previous week, and corresponded to an annual death-rate of 24·5 per 1000. The deaths referred to diseases of the respiratory system, which had steadily increased from 132 to 524 in the nine preceding weeks, further rose to 650 in the week under notice. The deaths from influenza numbered 86, against 55 and 81 in the two preceding weeks.

Of the 7863 deaths from all causes in the 95 towns, 253 resulted from violence, 557 were the subject of coroners' inquests, and 2070 occurred in public institutions. The causes of 106, or 1·3 per cent., of the total deaths were not certified either by a registered medical practitioner or by a coroner after inquest. All the causes of death were duly certified in Leeds, Bristol, West Ham, Salford, and in 60 other smaller towns. Of the 106 uncertified causes, 20 were registered in Birmingham, 19 in Liverpool, 8 in Manchester, 5 each in South Shields and Gateshead, and 4 each in London, Barrow-in-Furness, and Stockton-on-Tees.

In the 96 English and Welsh towns 5629 births and 7260 deaths were registered during the week ended Saturday, Dec. 30th, 1916. The annual rate of mortality, which had increased from 13·0 to 23·7 per 1000 in the six preceding weeks, fell to 21·9 per 1000 in the week under notice. During the 13 weeks of last quarter, the mean annual death-rate in these towns averaged 15·6, against 16·1 per 1000 in London.

During the week the death-rate ranged from 10·8 in Grimsby, 11·4 in Barnsley, 11·5 in Smethwick, 12·2 in Abberdare, and 15·5 in Ilford, to 29·6 in Reading, 31·0 in Norwich, 31·6 in Rotherham, 33·7 in Bath, and 35·3 in Warrington.

The 7260 deaths from all causes were 603 below the number in the previous week, and included 229 which were referred to the principal epidemic diseases, against 230 and 236 in the two preceding weeks. Of these 229 deaths, 80 resulted from infantile diarrhoeal diseases, 66 from measles, 42 from diphtheria, 26 from whooping-cough, 8 from scarlet fever, and 7 from enteric fever. The annual death-rate from these diseases was equal to 0·7 per 1000, and coincided with that recorded in each of the four preceding weeks. The deaths of infants (under 2 years) from diarrhoea and enteritis, which had steadily declined from 477 to 63 in the 15 preceding weeks, rose to 80, and included 30 in London, 5 in Birmingham, 4 in Liverpool, and 3 each in Leicester and Manchester. The deaths attributed to measles, which had been 56, 50, and 83 in the three preceding weeks, fell to 66, of which 25 occurred in London, 8 in Coventry, 6 in Edmonton, and 4 each in Manchester and Sheffield. The fatal cases of diphtheria, which had been 47, 61, and 53 in the three preceding weeks, further fell to 42, and included 7 in London and 3 each in West Ham and Birmingham. The deaths attributed to whooping-cough, which had been 23, 18, and 19 in the three preceding weeks, rose to 26, but showed no great excess in any town. The deaths referred to scarlet fever, which had been 8, 12, and 10 in the three preceding weeks, fell to 8, and included 2 each in Liverpool and Salford. The 7 fatal cases of enteric fever, of which 2 were registered in Bury, were 2 below the average in the earlier weeks of the quarter.

The number of scarlet fever patients under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, which had declined from 1171 to 922 in the seven preceding weeks, rose to 934 on Saturday, Dec. 30th; 86 new cases were admitted during the week, against 103, 100, and 100 in the three preceding weeks. The cases of diphtheria numbered 1485, against numbers declining from 1582 to 1445 in the five preceding weeks; the admissions during the week were 113, against 169, 158, and 136 in the three preceding weeks. These hospitals also contained on Saturday last 257 cases of measles, 48 of whooping-cough, and 37 of enteric fever. The 1932 deaths from all causes in London were 66 below the number in the previous week, and corresponded to an annual death-rate of 23·7 per 1000. The deaths referred to diseases of the respiratory system, which had steadily increased from 132 to 650 in the ten preceding weeks, fell to 645 in the week under notice. The deaths from influenza numbered 98, against 81 and 86 in the two preceding weeks.

Of the 7260 deaths from all causes in the 96 towns, 241 resulted from violence, 597 were the subject of coroners' inquests, and 1943 occurred in public institutions. The causes of 97, or 1·3 per cent., of the total deaths were not certified either by a registered medical practitioner or by a coroner after inquest. All the causes of death were duly certified in Leeds, Bristol, West Ham, Bradford, Hull, and in 61 other smaller towns. Of the 97 uncertified causes 19 were registered in Birmingham, 18 in Liverpool, 6 in Gateshead, 5 each in Warrington and Sheffield, and 4 each in Manchester and Barrow-in-Furness.

### HEALTH OF SCOTCH TOWNS.

In the 16 largest Scotch towns with an aggregate population estimated at 2,372,000 persons at the middle of this year, 1015 births and 794 deaths were registered during the week ended Saturday, Dec. 16th, 1916. The annual rate of mortality, which had been 15·4, 15·8, and 16·4 per 1000 in the three preceding weeks, rose to 17·5 per 1000 in the week under notice. During the first 11 weeks of the quarter just ended the mean annual death-rate in these towns averaged 14·5, against a corresponding rate of 14·3 per 1000 in the large English towns. Among the several towns the death-rate during the week ranged from 10·7 in Hamilton, 12·7 in Kirkcaldy, and 14·0 in Ayr, to 20·5 in Dundee, 23·0 in Perth, and 24·8 in Leith.

The 794 deaths from all causes were 47 in excess of the number in the previous week and included 37 which were referred to the principal epidemic diseases, against numbers declining from 53 to 38 in the three preceding weeks. Of these 37 deaths, 11 resulted from measles, 10 from infantile diarrhoeal diseases, 7 from whooping-cough, 5 from scarlet fever, 3 from diphtheria, and 1 from enteric fever, but not one small-pox. The annual death-rate from these diseases was equal to 0·8, against 0·7 per 1000 in the large English towns. The deaths attributed to measles, which had been 20, 16, and 12 in the three preceding weeks, numbered 11, of which 6 occurred in Dundee and 3 in Glasgow. The deaths of infants (under 2 years) from diarrhoea and enteritis, which had been 18, 10, and 14 in the three preceding weeks, fell to 10, and included 4 in Glasgow. The fatal cases of whooping-cough, which had been 1, 6, and 3 in the three preceding weeks, rose to 7, and comprised 2 each in Glasgow, Edinburgh, and Dundee, and 1 in Leith. The 5 deaths attributed to scarlet fever were slightly in excess of the average in the earlier weeks of the quarter, and included 2 each in Aberdeen and Clydebank. The deaths referred to diphtheria, which had been 9, 9, and 6 in the three preceding weeks, fell to 3, which were recorded in Glasgow, Aberdeen, and Kilmarnock respectively. The fatal case of enteric fever and one typhus were registered in Glasgow.

The deaths referred to diseases of the respiratory system, which had been 131, 118, and 155 in the three preceding weeks, rose to 191 in the week under notice, but were 17 below the number registered in the corresponding week of 1915. The deaths from violence numbered 34, against 26 in each of the two preceding weeks.

In the 16 Scotch towns 959 births and 892 deaths were registered during the week ended Saturday, Dec. 23rd. The annual rate of mortality, which had increased from 13·8 to 17·5 per 1000 in the three preceding weeks, further rose to 19·6 per 1000 in the week under notice. During the first 12 weeks of the quarter just ended the mean annual death-rate in these towns averaged 15·0, against 15·1 per 1000 in the large English towns. Among the several towns the death-rate during the week ranged from 10·7 in Falkirk, 12·4 in Motherwell, and 12·6 in Clydebank, to 24·0 in Coatbridge, 24·1 in Paisley, and 30·1 in Perth.

The 892 deaths from all causes were 98 above the number in the previous week, and included 46 which were referred to the principal epidemic diseases. These 46 deaths corresponded to an annual rate of 1·0 per 1000, and included 14 from measles, 12 from whooping-cough, 9 from infantile diarrhoeal diseases, 6 from diphtheria, 4 from scarlet fever, and 1 from enteric fever. The deaths attributed to measles,

which had declined from 20 to 11 in the four preceding weeks, rose to 14, and comprised 9 in Dundee, 2 each in Glasgow and Edinburgh, and 1 in Leith. The deaths referred to whooping-cough, which had been 6, 3, and 7 in the three preceding weeks, rose to 12, of which 5 occurred in Glasgow. The fatal cases of infantile diarrhoea, which had been 10, 14, and 10 in the three preceding weeks numbered 9, and included 3 in Glasgow and 2 in Edinburgh. The deaths from diphtheria were slightly below the average in the earlier weeks of the quarter, and showed no excess in any town. Two of the 4 deaths attributed to scarlet fever and the fatal case of enteric fever were recorded in Glasgow.

The deaths referred to diseases of the respiratory system, which had been 118, 155, and 191 in the three preceding weeks, further rose to 227 in the week under notice, and were 72 in excess of the number registered in the corresponding week of 1915. The deaths from violence numbered 33, against 26 and 34 in the two preceding weeks.

#### HEALTH OF IRISH TOWNS.

In the registration area of Dublin 99 births and 195 deaths were registered during the week ended Saturday, Dec. 23rd, 1916. The deaths were equal to an annual rate of 25·6, against 24·5 and 19·6 per 1000 in London and Glasgow respectively, and included 25 of infants under 1 year and 69 of persons aged 65 years and upwards.

Nine deaths were referred to infantile diarrhoea, 2 to measles, and 1 to enteric fever. The causes of 5 deaths were uncertified and those of 2 others were the subject of coroners' inquests, while 76 of the total deaths occurred in public institutions.

During the same period 146 births and 173 deaths were registered in the city of Belfast. The death-rate was equal to 23·1, or 4·1 per 1000 above that in the previous week. The total deaths included 18 of infants under 1 year and 46 of persons aged 65 years and upwards. Three deaths were referred to measles, 2 to enteric fever, and 1 to scarlet fever. The causes of 3 deaths were uncertified and those of three others were the subject of coroners' inquests, while 51 of the total deaths occurred in public institutions.

#### THE SERVICES.

##### ROYAL NAVAL MEDICAL SERVICE.

The following appointments have been notified:—Fleet-Surgeons: J. R. Muir to Wet-Hai-Wel Sick Quarters; J. S. Dudding to *Tiger*; and R. B. Scribner to *Pembroke*. Temporary Surgeons: W. H. Butcher to *Victory*; and M. O. Hunter to *Hastor* Hospital.

##### ROYAL ARMY MEDICAL CORPS.

Lieut.-Col. H. E. Winter is retained on the Active List, and to be supernumerary.

To be Lieutenant-Colonels: Major L. C. Parkes, R.A.M.C. (T.F.), Major A. Carless, R.A.M.C. (T.F.), and Major G. R. Phillip, C.A.M.C.

Temp. Major G. B. Price to be temporary Lieutenant-Colonel.

To be temporary Majors: Temp. Lieut. J. L. Birley (whilst employed on special duty), Capt. G. P. Taylor, and Temp. Capt. W. Penberthy (whilst commanding troops on a hospital ship).

To be temporary Captains: O. D. Rilance, C.A.M.C., C. P. Bligh-Wall, S.Afr.M.C., K. Bremer, S.Afr.M.C., S. Copley, S.Afr.M.C., J. C. Caldwell, S.Afr.M.C., Temp. Lieut. A. W. G. Murray, and Temp. Lieut. P. R. Lowe.

Temporary Captains relinquishing their commissions: J. D. Nicolas, W. J. G. Gayton, and S. Greenwood (on account of ill-health).

Temporary Lieutenants relinquishing their commissions: R. W. Halliday, H. C. Sutton, T. B. Shoolbread, J. J. MacRitchie, J. J. Hamelin, H. S. Bissell, A. B. Moffat, V. B. Cartwright, A. B. Roberts, H. B. Stacpoole, G. W. Carleton, E. F. Niven, R. Paterson, and C. R. M. Pattison.

##### SPECIAL RESERVE OF OFFICERS.

Lieut. S. W. Hoyland to be Captain.

To be Lieutenants: M. J. Burns, C. Weir, J. A. H. Miller, W. Corner, W. Yeoman (from University of London Contingent, Officers Training Corps), S. C. Swinburne (from Edinburgh University Contingent, Officers Training Corps), and B. Mountain.

Capt. P. C. MacRae relinquishes his commission on account of ill-health.

Second Lieut. A. G. D. Gavin, M.C., resigns his commission to resume medical studies.

##### TERRITORIAL FORCE.

Major C. R. White to be temporary Lieutenant-Colonel.

Major A. Carless is seconded whilst holding a temporary commission in the R.A.M.C.

Capt. E. W. Holyoak to be seconded.

General Hospitals: Capt. V. W. Low, C.B., is restored to the establishment.

Sanitary Companies: Lieut. N. Gebble to be Captain.

Capt. (temp. Major) J. E. W. MacFall relinquishes his temporary rank on ceasing to command a Field Ambulance.

Capt. J. B. Sinson relinquishes his commission on account of ill-health.

*Supernumerary for Service with the Officers Training Corps.*

Lieut. (temp. Capt.) E. W. Walker to be Captain.

*Attached to Units other than Medical Units.*—Capt. R. Paterson relinquishes his commission on account of ill-health, and is granted permission to retain his rank and wear the prescribed uniform.

##### INDIAN MEDICAL SERVICE.

Surg.-Gen. Sir C. P. Lukis, K.C.S.I., Director-General, to rank as Lieutenant-General.

**CENTENARIANS.**—The *Times* states that on its front pages during 1916 the deaths of 321 persons who had reached the age of 90 and over were reported. Of these eight were over 100 (seven women and one man), the average age of the total number being a fraction over 93. The list includes 17 clerks in holy orders, and in 40 below the record of 1915.

## Correspondence.

"Audi alteram partem."

#### THE NOMENCLATURE OF "INTERNAL SECRETION."

*To the Editor of THE LANCET.*

SIR,—It must long have been evident to all those interested in the subject that our nomenclature concerning what we describe as "internal secretion" is extremely unsatisfactory. Professor Sir E. A. Schäfer in his recent book, "The Endocrine Organs," discusses the question, but unfortunately he does not improve matters, for he adheres to the indefensible word "endocrine," and introduces several other unnecessary terms. The word "endocrine," which Professor Schäfer and many other authorities employ, is supposed to be derived from *τύπω* (within) and *κρίνω* (I separate)—the compounded word being taken to mean "internally separating" when used as an adjective. But surely it is not classical to combine an adverb with a verb in Greek. The only adjective that can be formed from this combination is "endocrinic," and such words as "endocrinous" and "endocrine" are malformations. I think, also, that even "endocrinic," which I have been in the habit of using myself, is a poor word, and that we can find a better one.

Professor Bayliss and Professor Starling in 1903 introduced the term "hormone," derived from *ὅρμα* (I arouse); and they defined a hormone as a "chemical messenger." Professor Schäfer, however, objects to the word "hormone" being used indiscriminately for every internal secretion, for he considers that it implies an *exciting* agent only. His argument is that there are among the internal secretions not only exciting agents, which he would call "excitatory autocoids" (*αὐτός*=self, and *ἕκσος*=a medicinal agent or remedy) or "hormones," but also "inhibitory autocoids" or "chalones" (*χαλώ*=I make slack), as he would designate them.

It appears to me that Professor Schäfer's limitation of the word "hormone" is not really valid. In the first place, Professor Bayliss and Professor Starling are entitled to define their own term; and they have done so, as I think, correctly, although metaphorically. In the second place, since it is admitted that the word "hormone" implies "a substance that arouses," surely it can be taken as meaning a "chemical messenger," which *provokes either activity or inhibition*. The important point is that, in picturesque language, the agent in question is a chemical messenger, and therefore the terms "autocoids" and "chalones" are superfluous, even though they may be entirely correct in their meaning and derivation. We have, then, a descriptive and well-established noun "hormone," but we still require a noun for the hormone-making process and an adjective to indicate the hormone-making organs; consequently, I would suggest that the words "hormopoiesis" and "hormopoietic" respectively be added to our scientific vocabulary. Their derivation is obvious and, I think, unassailable. Further, they are in direct sequence from the term "hormone" and their meaning is quite clear. It is possible that these words have occurred to others, but I have never come across them.

I am glad to be able to say that both Sir Clifford Allbutt and Professor Starling entirely approve of the terms which I beg to suggest for general adoption.

I am, Sir, yours faithfully,

Liverpool, Dec. 28th, 1916.

W. BLAIR BELL.

#### THE PARLIAMENTARY REPRESENTATIVE OF DUBLIN UNIVERSITY.

*To the Editor of THE LANCET.*

SIR,—May we claim a small space in THE LANCET in order to urge upon its readers who are entitled to vote for a Parliamentary representative of Dublin University to record their votes at the forthcoming election for Sir Robert Woods, who is standing as a non-party candidate?

It would be idle for us to dwell upon the advantages that should accrue to the nation, and in particular to the medical

profession, by having in the House of Commons a distinguished scientific representative like Sir Robert Woods. It must be obvious to the medical graduates of Dublin University that the legal profession has had more than its share in the Parliamentary representation of the University, and a splendid opportunity is now offered whereby a change may be effected in this direction.

Owing, however, to the large number of medical graduates who are serving their king and country in the various theatres of the present war it will be extremely difficult to get into direct communication with many of the voters. We would, therefore, appeal to your readers, as this is a matter of urgency, to forward immediately to the appended address the addresses of any doctors of medicine of Dublin University who are known to them to be absent from their usual home addresses, so that proxies may be sent to such voters.

We are, Sir, yours faithfully,

A. FRANCIS DIXON,  
Professor of Anatomy; JAMES CRAIG,  
Honorary Secretaries.  
King's Professor of Practice of Medicine;  
24, Trinity College, Dublin, Dec. 30th, 1916.

### "SHELL SHOCK."

To the Editor of THE LANCET.

SIR.—It is interesting, and to me gratifying, to find that Captain E. Farquhar Buzzard has quite independently come to exactly the same conclusions as I expressed in my paper on the psychology of malingering and the functional neuroses published in your issue of Nov. 18th last. I hope those conclusions may now be generally recognised as indisputably correct.

"Shell shock" is a misleading and bungling term, covering several different disorders which were familiar before the war, viz.: (1) neurasthenia, due to lack of "ergogen" in the brain cells; (2) hysteria, or subconscious malingering following on emotional shock; (3) malingering of a purely conscious nature; and, lastly, (4) various combinations of the above.

It is, as Captain Buzzard points out, essential that such an analysis of "shell shock" cases should be made if they are to be satisfactorily treated, and it is well that the patients should recognise that they are not suffering from some new and wonderful disorder, but from common and curable diseases with which every physician has long been familiar. Appreciation of this fact will *per se* accelerate recovery.

I am, Sir, yours faithfully,

South Eaton-place, S.W., Jan. 1st, 1917. THOMAS LUMSDEN.

### LORD ROBERTS'S FIELD GLASSES: A RETROSPECT OF TWO YEARS' WORK.

To the Editor of THE LANCET.

SIR.—Soon after the outbreak of the war, my father, Lord Roberts, asked the public to lend their glasses for the use of the Army. After two years I think your readers may be glad to have some particulars of the result of his request.

Upwards of 26,000 glasses have been received, without reckoning those which, in pursuance of my father's suggestion, have been collected in Australia, the Malay States, and elsewhere, and issued forthwith to the local forces on their way to the seat of war. The instruments sent comprise every type, and have been classified and issued according to the needs of different units. Particularly useful have been the fine prismatic glasses sent which have been allocated to artillery and machine-gun units, according to their power; large mounted telescopes for batteries; deer-stalking telescopes for gunners and snipers, and good old-fashioned non-prismatic racing glasses for detection of the nationality of aircraft, locating snipers, signalling by disc, collecting wounded, and musketry instruction. I am indeed grateful for the way in which my father's appeal has been met. British people all over the world have given their best, recognising that, in spite of the fact that their glasses are on loan and that the organisation for their return has been arranged, the chances of loss are many, and that they may never get their glasses back.

When I think of the enormous numbers of good glasses sent it may seem ungracious to ask for more, but the demand

is still great. I am told that at watering places, and on racecourses and elsewhere, large numbers of glasses are still to be seen in private hands, and to the owners of these I would once more appeal. I should add that we have been entrusted by the Ministry of Munitions with the purchase of individual glasses from those who cannot afford to lend them, and that the address for sending glasses for either purpose is the same. Every good glass (except opera-glasses) and every telescope (except toys) is wanted for the service of the country.

Glasses should be addressed to the Manager of Lady Roberts' Field Glass Fund, National Service League, 72, Victoria-street, S.W.

I am, Sir, yours faithfully,

December, 1916.

ROBERTS.

### THE RESULTS OF FEEDING MICE WITH MOUSE CANCER.

To the Editor of THE LANCET.

SIR.—We are gratified to see in the report of the meeting of the Section of Pathology of the Royal Society of Medicine in your issue of Dec. 16th, 1916, that Professor S. G. Shattock and Mr. L. S. Dudgeon, as the result of experiments on feeding mice with tumours, suggest virtually the same hypothesis as that we published in THE LANCET of March 4th, 1916, as a deduction from the results of injecting sarcoma filtrate or feeding on streptothrix isolated from rat sarcoma. We there put forward the suggestion that the parasite is very small and enters into the cell, possibly the nucleus, from which it is set free by the mincing process. The streptothrix appears to be a parasite present in tumours, and in one cycle of its growth it may be really ultra-microscopic, but at present this is unproved. Certainly we have not, so far, succeeded in obtaining a differential stain to demonstrate the parasite in the tissues, in spite of its comparatively easy cultivation from them. We experienced the same difficulty again recently in a case of streptothrixosis in a cow. The streptothrix isolated from the tissues proved fatal to a guinea-pig in three weeks and it was recovered by cultivation from the guinea-pig tissues, but it could not be shown in the sections or films prepared from the tissues of either the cow or the guinea-pig.

Of course, the successful production of tumours in mice, by feeding with malignant material, has been observed and recorded at least once before, by Ford Robertson, in 1909.

We are, Sir, yours faithfully,

A. S. LEYTON.

University of Leeds, Dec. 23th, 1916.

H. G. LEYTON.

### SUPRARENAL HÆMORRHAGE IN CEREBRO-SPINAL FEVER.

To the Editor of THE LANCET.

SIR.—In THE LANCET of Dec. 23rd, 1916, Captain P. W. Maclagan and Captain W. E. Cooke describe some cases of cerebro-spinal fever characterised by rapid death and suprarenal haemorrhage. I should like to point out that Karakaschaff in 1904<sup>1</sup> described the case of a child who died from some other cause, and who had the medulla of both suprarenales calcified from old haemorrhage. While in hospital there were no signs of suprarenal disease. I myself have seen a specimen from a child whose symptoms were typical of suprarenal haemorrhage, yet here the damage was purely cortical. So also in Addison's disease. The rare cases of that condition which depend on "simple atrophy" show, if the atrophy has not gone too far, medulla surviving and cortex gone. It therefore appears, as I pointed out at the Pathological Society in January, 1914<sup>2</sup>, that suprarenal haemorrhage and Addison's disease are fundamentally the same.

If I am asked why the blood pressure drops, I can only say that I do not know, but I can also ask if we are justified in assuming that loss of blood pressure always depends on loss of adrenalin.—I am, Sir, yours faithfully,

S. G. SCOTT,

Netley, Hants, Dec. 31st, 1916. Temporary Lieutenant, R.A.M.C.

<sup>1</sup> Ziegler's Beiträge, xxxvi., 401.

<sup>2</sup> Jour. of Path. and Bact., xviii., 419.

## Obituary.

JAMES LITTLE, M.D. & HON. LL.D. EDIN.,  
HON. M.D. DUB., &c.,

PAST PRESIDENT OF THE ROYAL COLLEGE OF PHYSICIANS OF IRELAND;  
REGIUS PROFESSOR OF PHYSIC IN THE UNIVERSITY OF DUBLIN;  
HONORARY PHYSICIAN TO HIS MAJESTY THE KING  
IN IRELAND.

THE death occurred on Dec. 23rd of James Little, Regius Professor of Physic in the University of Dublin, and one of the best known physicians in the United Kingdom. For some months past he had suffered from a failing heart, but he insisted on attending the recent session of the General Medical Council, of which he was a Crown nominee. On his return home he was carried to bed, and passed quietly away.

James Little was born at Newry in 1837. He was educated at Cookstown Academy and at the Royal School, Armagh, and was apprenticed to his profession at Armagh. Later he studied medicine at the medical schools of Trinity College, Dublin, and the Royal College of Surgeons in Ireland and attended the practice of the Richmond Hospital. In 1856 he became L.R.C.S. Ire., and shortly afterwards took a medical appointment at Calcutta. He remained in India for three years, and on his return continued his medical studies. In 1861 he graduated in medicine in Edinburgh, and began to practise in Lurgan, but soon migrated to Dublin. He was elected physician to the Adelaide Hospital as long ago as 1864, and with this institution the whole of his professional life was closely associated.

In 1867 he became a Fellow of the Royal College of Physicians of Ireland, and subsequently served as registrar and examiner, being elected President in 1887.

Little's professional progress on arrival in Dublin was remarkably rapid. In 1868 he became lecturer on medicine in the Ledwich School, and in 1872 he was elected professor of medicine in the Royal College of Surgeons in Ireland. He resigned this chair in 1883, by which time his private practice had become very great, though it was not until 1898 that the resignation by Sir John Banks of the Regius Professorship of Physic in the University of Dublin gave him his connexion with Trinity College, which lasted up to his death. For many years past he was one of the Crown nominees on the General Medical Council, and he was honorary physician to His Majesty the King in Ireland. He was a past-president of the Royal Academy of Medicine in Ireland, and of the Association of Physicians of Great Britain and Ireland. He was consulting physician to several Dublin hospitals—the Rotunda, Dr. Steevens', the Royal Victoria Eye and Ear, and of late years, since his resignation of the post of visiting physician, to the Adelaide Hospital.\*

In his earlier days he wrote occasional articles for the medical papers, and he was the author of two small books: "First Steps to Clinical Studies" and "Chronic Disease of the Heart." Of late years he wrote little. A man of great physical and mental vigour, Little was a remarkably hale man and youthful for his age until comparatively recently. In 1914 he lost his wife, and the bereavement grieved him sorely. Shortly afterwards the Dublin rising tried him further, for his house was in the thick of much of the fighting and was fired into repeatedly. The old man went out fearlessly to attend professional calls, but he knew that he did so at the risk of his life. Last summer his health broke down definitely; but he was determined to attend the winter meeting of the General Medical Council in London, from which he returned a dying man.

Our Dublin Correspondent writes:—

For more than a generation James Little occupied a unique position in Irish medicine. It was not only that he was the leading physician and the first consultant in Ireland, but his voice was regarded as representative, in a special sense, of the medical profession with us. He was our unofficial head. For many years he enjoyed by far the largest practice in the country, probably one of the largest in the kingdom. He won it early in life, and he held it, almost without competition, for many years. To some it seemed that he secured it too easily, but the view was held only by those who did not know him well enough to recognise the native ability and shrewdness of the man, his painstaking study of

his patients, and his marvellous command of his own experience. His method was clinical rather than pathological. He reasoned with marvellous memory from patient to patient, and his judgment seemed to be intuitive when it was based really on close observation. He was fortunate in retaining his freshness and receptivity of mind to old age, and he made generous use of younger men who were conversant with the newer methods of diagnosis or treatment. No leader was ever more considerate or generous to his younger colleagues in the profession, and there are not a few men now well established in medical practice in Ireland who owe much of their success to Dr. Little's early encouragement.

WILLIAM CAYLEY, M.D. LOND., F.R.C.P. LOND.,  
CONSULTING PHYSICIAN TO THE MIDDLESEX HOSPITAL, AND TO THE  
QUEEN'S HOSPITAL FOR CHILDREN, ETC.

By the death of Dr. William Cayley, which took place on Dec. 17th after a brief illness, British medicine has lost one of its wisest exponents, whose exceptional gifts and sterling qualities were less widely known than they deserved to be. He died a few days after attaining the age of 80 at his house at Richmond, which he had occupied since his retirement from practice about 15 years ago. He retained to the last a keen interest in the hospitals to which he had been attached, and it was as the result of a chill contracted whilst attending a committee meeting at one of them that his fatal illness developed.

William Cayley was born at Stamford, Lincolnshire, on Dec. 14th, 1836, being the fifth of six sons of the late Edward Cayley, a partner in the banking firm of Eaton, Cayley, and Co. of that town. The family traced its descent from Cornelius Cayley, fourth son of Sir William Cayley, of Brompton, Yorkshire, who was created a baronet by Charles II. in 1681. William Cayley survived all his brothers, two of whom obtained distinction—Sir Richard Cayley, Chief Justice of Ceylon, and Surgeon-General Harry Cayley, of the Indian Medical Service. He was educated at Shrewsbury, where he imbibed a love of the classics which he retained throughout his life. His medical education was received at King's College, London, whence he graduated at the University of London, and obtained the M.D. in 1861. He then, as was not unusual amongst English and American graduates, proceeded to Vienna, where there existed opportunities for clinical and pathological research under professors of worldwide reputation such as Skoda and Rokitansky. He was chiefly attracted to the study of pathology, and his first medical appointment after settling in London was that of demonstrator of morbid anatomy at the Middlesex Hospital, where his fellow-student, Robert Liveing, had been engaged for the past year as demonstrator of anatomy in succession to W. H. Flower. At that time there were on the hospital staff three other men who had been trained at King's College. Charles Murchison was the senior assistant physician and J. W. Hulke and George Lawson the two assistant surgeons. It was not until 1870 that Cayley became assistant physician, but he continued to superintend the post-mortem examinations for some years by himself. In 1867 this duty was shared by the medical and surgical registrars, the first holders of which were Cayley and Henry Arnott. Their reports for the two years they held these offices were, we believe, the first of the kind issued by any London hospital. In 1869 Dr. John Murray was appointed medical registrar and Mr. (now Sir) Henry Morris surgical registrar. In the medical school Cayley, in 1866, became joint lecturer on pathological anatomy with Mr. Sibley, in succession to Dr. Burdon Sanderson, who was made lecturer on physiology, a subject hitherto taught in connexion with anatomy. For two or three years he had also assigned to him a class of histology, whilst continuing to teach pathological anatomy, having in the latter subject as colleagues Mr. Arnott and Dr. Murray in succession. In 1869 he succeeded Dr. Spencer Cobbold as curator of the museum.

The year 1870 brought many changes in the personnel of the Middlesex staff. Dr. Murchison, who was now full physician and lecturer on medicine, with an established reputation as a clinical teacher, accepted, together with Mr. Arnott (recently appointed assistant surgeon), an invitation to join the staff of St. Thomas's Hospital, whose new and palatial buildings on the south bank of the river had just been completed. In the same year Dr. Burdon Sanderson left to fill the chair of practical physiology at University College. Dr. Robert Liveing became senior

assistant physician, Dr. Greenhow succeeding to the physiciancy vacated by Dr. Murchison, and first Dr. Cayley and then Dr. Murray became assistant physicians. On the resignation, in 1876, of Dr. Liveing, who had become physician in 1872, Dr. Cayley was promoted to the full staff, becoming senior physician on the death of Dr. Greenhow in 1876. He resigned office in 1901, within a few months of attaining the age-limit, and was appointed by the governors consulting physician. In the medical school he continued to lecture on pathological anatomy until 1876, when he succeeded to the lectureship in medicine, which he undertook for nearly 25 years. He devoted much time and labour to the affairs of the school, the increasing prosperity and extension of which were very gratifying to him, and he seldom missed, even for some years after his retirement, attending the October gatherings and annual meeting of the club, where an opportunity was given for reunion of those who had received their training at the hospital.

Besides his appointments at the Middlesex Hospital, Dr. Cayley was for 20 years physician to the London Fever Hospital and for about 15 years to the North-Eastern (now the Queen's) Hospital for Children. In 1892 he was made consulting physician to each of these institutions. He was elected a Fellow of the Royal College of Physicians of London in 1872. He held at various periods the offices of examiner, councillor, and senior censor, and in 1880 was selected to deliver the Croonian lectures. He took for his subject the Pathology and Treatment of Typhoid Fever, upon which his experience as physician to the London Fever Hospital entitled him to speak with authority. Those privileged to attend these lectures could not fail to have been impressed by the depth of knowledge and the cogency of reasoning they revealed. They were delivered, or rather recited, without a note, with steady fluency—a truly remarkable effort of memory—for they were packed full of details, which were given in ordered sequence without a break. The first lecture on etiology adduced striking facts in opposition to the possible and not infrequent independent or *de novo* origin of the disease, which was held so staunchly by Dr. Murchison; in the second lecture the pathology was discussed, and the clinical course of the fever lucidly explained, as well as the degenerative lesions produced by the pyrexial state; all leading up to the thesis advanced with overwhelming force in the third lecture of the value of antipyretic treatment, especially by the use of cold baths, as originally advocated by Currie, then set aside and forgotten until revived by Brand of Stettin in his treatment of the fever-stricken soldiers who were taken prisoners in the war of 1870. When, after Dr. Murchison's death, Dr. Cayley was entrusted with the editing of the third edition of that great physician's *magnum opus*, "The Continued Fevers of Great Britain," he was careful not to interfere with the arguments therein so amply developed in favour of the "pyrogenic" origin of typhoid, but was content with brief interpolated notes, which showed how readily the facts might bear another interpretation. The bacillus had not yet been discovered, and it was 20 years or more before the "carrier" doctrine shed light on the origin of many an obscure case; but Cayley felt sure of his ground and saw no reason to change it.

He wrote the articles on typhoid fever for Fowler's "Dictionary of Medicine" and Allochin's "Manual of Medicine," but otherwise did not contribute very freely to medical literature. The second number of the newly established *Middlesex Hospital Medical Journal* contains an interesting clinical lecture by him on Cirrhosis of the Liver, which may be taken as an example of his teaching and the bearing of pathological knowledge on clinical facts and treatment. When he was first appointed to the charge of the post-mortem room he joined the Pathological Society, as in those days every aspirant to the London world of medicine and surgery felt it incumbent to do. The society was then nearing the zenith of its fame, and its fortnightly meetings at the Royal Medical and Chirurgical Society's rooms in Berners-street were amongst the most interesting of such gatherings. Middlesex Hospital was fortunate in being within a stone's-throw of the meeting-place, and its members contributed many a specimen. Cayley was an active member, for, besides his own exhibits, he had many specimens referred to him for examination in which he made good use of his histological knowledge; and when the Morbid Growths Committee was founded he long retained

a seat on it. In this society he filled in turn the offices of medical secretary, treasurer, and Vice-President. He was one of the original members of the Clinical Society, the foundation of which, in 1867, apparently emanated from members of the Middlesex staff. Of the 128 original members only 7 or 8 now survive, and the society is merged in the Royal Society of Medicine.

Cayley also belonged to the Royal Medical and Chirurgical Society, and several of the papers contributed by him to these societies illustrate the bent of his mind, in regard to the treatment of conditions beyond the power of medicine to do more than alleviate. He was well aware that resort to surgical intervention in such cases was often but a last resource, but having made up his mind as to the nature of the case and its hopelessness from the medical standpoint he had the courage and boldness to turn to the surgeon for aid. Thus to the Clinical Society he contributed papers on cases of (1) gangrene of lung treated by incision; (2) intestinal obstruction relieved by gastro-enterotomy; (3) haemoptysis treated by induction of pneumothorax so as to collapse the lung; and (4) perforation of bowel in typhoid fever treated by washing out the peritoneal cavity and excising the perforation; and in the Transactions of the Royal Medical and Chirurgical Society will be found two papers by him: one of a case of gangrene of lung successfully treated by drainage, and the other of a case of thoracic aneurysm treated by the introduction of steel wire into the sac.

Cayley's quiet, reserved, and unassuming character, his unbounded kindness of heart, his freedom from envy or ambition, and the charitable disposition which never allowed him to utter a word of disparagement or criticism of others, even when, in the opinion of most men, such comment would seem to have been fully justified—these are some of the traits that endeared him to all who knew him. One of these writes to us as follows:—"His was, indeed, an exceptional nature, and one felt in his presence that he could thoroughly be relied on in any of the trials and emergencies of life." His love of botany and of the Alps led him year by year to spend his summer vacation with congenial companions tramping in Switzerland, or the Tyrol, or by the Italian lakes. He knew Switzerland by heart, and as a member of the Alpine Club he made many a hazardous ascent. Perhaps the worst thing he felt in growing old was that he was no longer equal to these expeditions. But he found solace in his books and his garden, where he cultivated the flowers that he loved the most, and when the call came to him he was prepared, nay even glad, to depart, for he had spent a long, happy, and contented life, and had placed all his great gifts at the service of humanity.

#### RICHARD BARWELL, F.R.C.S. ENG., CONSULTING SURGEON TO CHARING CROSS HOSPITAL.

By the death of Mr. Richard Barwell in his native city of Norwich, at the mature age of 90, the Royal College of Surgeons of England has lost its senior Fellow and Charing Cross Hospital a consulting surgeon.

Richard Barwell was educated at St. Thomas's Hospital, becoming M.R.C.S. in 1848 and Fellow in 1852. Thus he had outlived all his contemporaries and most even of his junior colleagues. He was appointed lecturer on anatomy at the medical school of Charing Cross in 1868 and assistant surgeon in 1855, his seniors being Hancock, late President of the Royal College of Surgeons of England, and Canton. In 1872 he became full surgeon, and from that date until his retirement in 1888 he led an active and strenuous life. A list of his contributions to the Transactions of the societies is evidence of his activity in various directions. In 1863 he published a work on the "Cure of Club-foot without Cutting Tendons," and in 1868 his work on "Lateral Curvature of the Spine" appeared, which reached a fifth edition in 1895. In 1880 he wrote on "Aneurysm of the Thorax and at the Root of the Neck," and in 1881 he published a "Treatise on Diseases of the Joints."

A paper which he read before the Royal Medical and Chirurgical Society in 1881, on Experience in Specimens of the Ox Aorta Ligature, attracted considerable attention. In it he pointed out that certain cases of aortic aneurysm might be benefited by deligation of the right carotid and subclavian arteries, and insisted upon the advisability of leaving

the inner and middle coats of the arteries tied in continuity, intact. To this end he advocated the use of a ligature which would not cut those tissues, and claimed that the ligature cut from the aorta of an ox and dried fulfilled the requirements. A remarkable case of hypertrophy of the right side of the face in a boy aged 7 was described by him in the Pathological Society's Transactions, vol. xxxii. The specimen is now in the Charing Cross Museum showing great enlargement of the tissues, including the bones, a specimen which, in the opinion of Professor A. Keith, is unique.

Mr. Barwell quickly appreciated the immense value of Lister's treatment, but owing to lack of opportunity he never fully mastered all the details, which during his life of active surgery were largely subjects of experiment. He therefore failed to obtain the results which later surgeons with fuller experience now regard as assured.

Mr. James Cantlie writes: "Mr. Barwell was endowed with a painstaking and original mind and one well calculated to deal with the mechanical disabilities due to paralysis of groups of muscles, such as occurs in club-foot, and the profession is to-day indebted to many expedients introduced by him in these afflictions. His enthusiasm found him visiting cripples' homes, workhouse infirmaries, homes for incurables, &c., in pursuance of a study which in his day was seriously neglected, and upon which he succeeded in directing the attention of the profession generally." It was due to a suggestion by Mr. Cantlie that he should ligature an artery with an artery that he evolved the idea of the ox aorta ligature, and it was as a consequence of this that the catgut ligature was evolved. As an expert in orthopaedic surgery Mr. Barwell took a high place. His lectures to students upon lateral curvature and its treatment were classics in their completeness, and showed an originality of thought and conception only equalled by the clever technical devices by which he brought his ideas into practice.

Among his many friends Mr. Barwell will be remembered as an enthusiastic fisherman and an ardent skater. He was one of the best-known figures at the skating club in the grounds of the Toxophilite Society in Regent's Park, and he maintained his devotion until late in life to these pastimes. Their pursuit contributed to his hale old age, for no one would imagine that his trim figure and almost boyish step and carriage belonged to a man approaching 90 years of age.

**DEATH OF BRIGADE-SURGEON ALEXANDER CAMPBELL McTAVISH.**—Honorary Brigade-Surgeon A. C. McTavish, Army Medical Department (retired), died at his residence at Kingswear, Devon, on Dec. 2nd last. The deceased qualified L.R.C.S. Edin. in 1858, and shortly afterwards entered the Army Medical Department, being attached to the 60th Rifles. In 1860 he went to the Madras Presidency, and in 1863 was thanked by the Commander-in-Chief for his services in connexion with the cholera epidemic at Thayet-Myo. Later he was at Calcutta, and in 1874 was attached to the 17th Lancers. He served for many years in India, being invalided home in 1880, when he retired from the service.

**THE LATE MR. W. J. BEST.**—William Jenner Best, whose death occurred rather suddenly at the age of 51, was the son of the late Dr. Palmon Best, J.P., of Louth, Lincolnshire. He was educated at Rugby and Cambridge, receiving his medical education at the London Hospital and University and King's College, London. For the past 27 years he practised at Louth, taking his father's practice when the latter retired some years ago. He was very popular among his numerous patients, as well as among his medical colleagues at Louth.

AN advanced course of lectures on infant care for nurses, midwives, voluntary health workers, mothers, &c., will be held, under the auspices of the National Association for the Prevention of Infant Mortality and for the Welfare of Infancy, from Jan. 8th to Feb. 15th, on Mondays, from 3 to 4 P.M., at 1, Wimpole-street (corner of Henrietta-street, Cavendish-square), and on Thursdays, from 3 to 4 P.M., at the St. Marylebone General Dispensary, 77, Welbeck-street, W. Among the lecturers announced are Mrs. Scharlieb, M.D., Dr. Amand Routh, Dr. Eric Pritchard, Mrs. Shepherd, M.B., Dr. F. Langmead, Lady Barrett, M.D., Dr. R. C. Jewesbury, Dr. H. C. Cameron, Dr. John D. Rolleston, Dr. David Forsyth, and Dr. J. Lawson Dick.

## The War.

### THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue:—

#### Killed.

Major P. A. Lloyd-Jones, D.S.O., R.A.M.C., was educated at Cambridge and at St. Bartholomew's Hospital, London, and graduated in 1904. He shortly afterwards joined the R.A.M.C., being gazetted major in July, 1915, and held a staff appointment as Deputy Assistant Director of Medical Services. He received the Order of the Crown of Italy for rescue work during the Messina earthquake, and had seen service in the South African War.

#### Wounded.

Capt. M. H. Barton, R.A.M.C., attached Leicester Regiment.  
Lieut. T. G. H. Drake, R.A.M.C.  
Capt. V. N. Rich, R.A.M.C., attached Dorset Regiment.

### THE HONOURS LIST.

The following awards to medical officers are announced:—

#### K.C.B.

Surg.-Gen. H. R. Whitehead, C.B.

#### C.B.

Col. (temp. Surg.-Gen.) J. M. Irwin, late R.A.M.C.; Col. R. L. R. Macleod, A.M.S.; Col. G. Cree, C.M.G., A.M.S.; Col. A. R. Sutton, D.S.O., A.M.S.; Col. G. H. Barefoot, C.M.G., R.A.M.C.; Temp. Col. T. Sinclair, A.M.S.; Lieut.-Col. E. T. F. Birrell, C.M.G., R.A.M.C.; Col. H. S. Birkett, Canadian A.M.C.; Col. J. A. Roberts, Canadian A.M.C.

#### K.C.M.G.

Surg.-Gen. R. W. Ford, C.B., D.S.O.; Col. M. P. C. Holt, C.B., D.S.O., A.M.S.

#### C.M.G.

Col. T. Daly, R.A.M.C.; Col. W. L. Gray, R.A.M.C.; Col. F. R. Newland, A.M.S.; Col. H. T. Knaggs, A.M.S.; Col. H. I. Pocock, R.A.M.C.; Col. B. H. Scott, R.A.M.C.; Col. R. W. Wright, R.A.M.C.; Col. T. Du B. Whaite, R.A.M.C.; Col. F. J. Morgan, A.M.S.; Temp. Col. T. C. English, A.M.S.; Lieut.-Col. A. R. Aldridge, C.S.I., Res. of Off., R.A.M.C.; Lieut.-Col. (temp. Col.) J. D. Ferguson, D.S.O. R.A.M.C.; Lieut.-Col. S. H. Withers, R.A.M.C.; Lieut.-Col. (temp. Col.) F. R. Buswell, R.A.M.C.; Lieut.-Col. L. F. Smith, R.A.M.C.; Lieut.-Col. (temp. Col.) F. A. Symons, D.S.O., R.A.M.C.; Temp. Lieut.-Col. G. M. Holmes, R.A.M.C.; Temp. Lieut.-Col. H. L. Eason, R.A.M.C.; Lieut.-Col. A. Sutton, Australian A.M.S.; Lieut.-Col. E. C. Hart, Canadian A.M.C.

#### Brevet-Colonel.

Lieut.-Col. H. H. Norman, R.A.M.C.

#### Brevet-Lieutenant-Colonels.

Maj. G. Ormrod, R.A.M.C.; Maj. (temp. Lieut.-Col.) E. Ryan, D.S.O., R.A.M.C.

#### Distinguished Service Order.

R.A.M.C.—Capt. R. G. Archibald, empld. Egypt. Army; Capt. F. R. Armitage.

Lieut.-Col. M. H. Babington; Capt. (temp. Maj.) W. K. Beaman; Capt. F. A. Bearn, M.C., Spec. Res.; Maj. (temp. Lieut.-Col.) W. Bennett; Lieut.-Col. W. A. Benson; Capt. (temp. Maj.) R. E. Bickerton; Maj. (temp. Lieut.-Col.) E. B. Bird; Maj. R. B. Black, Res. of Off.; Lieut.-Col. (temp. Col.) R. J. Blackham, C.I.E.; Lieut.-Col. (temp. Col.) E. W. Bliss; Maj. (temp. Lieut.-Col.) J. H. Brunskill; Maj. (temp. Lieut.-Col.) R. A. Bryden.

Capt. H. M. Calder; Lieut.-Col. F. F. Carroll; Lieut.-Col. R. W. Clements; Lieut.-Col. H. Collinson; Maj. J. H. M. Conway; Capt. M. Coplands.

Maj. (temp. Lieut.-Col.) H. A. Davidson; Capt. D. Dickie; Capt. (temp. Maj.) G. H. Dive; Lieut.-Col. (temp. Col.) H. M. Dunn.

Capt. (temp. Maj.) G. B. Edwards; Lieut.-Col. O. W. A. Elsner; Maj. H. H. A. Emerson.

Maj. and Bt.-Lieut.-Col. (temp. Lieut.-Col.) F. G. Fitzgerald.

Maj. (temp. Lieut.-Col.) W. R. P. Goodwin.

Maj. W. Haig; Maj. (temp. Lieut.-Col.) T. E. Harty; Maj. (temp. Lieut.-Col.) W. J. S. Harvey; Lieut.-Col. F. Hawthorn; Lieut.-Col. H. Hewetson; Lieut.-Col. H. C. R. Hime; Maj. (temp. Lieut.-Col.) A. E. Hodder; Maj. (temp. Lieut.-Col.) C. W. Holden; Capt. F. D. G. Howell; Lieut.-Col. W. E. Hudleston; Maj. (temp. Lieut.-Col.) D. O. Hyde.

Maj. O. Ivvers; Lieut.-Col. E. T. Inkson, V.C.

Maj. J. T. Johnson.

Maj. (temp. Lieut.-Col.) H. B. Kelly.

Lieut.-Col. J. W. Langstaff; Temp. Maj. (temp. Lieut.-Col.) C. E. Ligertwood.

Maj. (temp. Lieut.-Col.) E. McDonnell; Capt. (temp. Maj.) D. F. Mackenzie; Maj. (temp. Lieut.-Col.) J. Mackinnon; Lieut.-Col. C. W. Mainprise; Temp. Capt. J. D. Marshall; Maj. J. St. A. Maughan; Maj. C. R. Millar; Temp. Capt. R. M. Miller; Lieut.-Col. E. M. Morphew.

Maj. S. L. Pallant; Temp. Capt. W. N. Parker; Capt. (temp. Maj.) T. H. Peyton; Lieut.-Col. (temp. Col.) C. E. Pollock; Lieut.-Col. (temp. Col.) H. V. Prynne; Capt. (temp. Maj.) W. B. Purdon, M.C.; Maj. L. M. Purser.

Lieut.-Col. W. Ransom; Maj. (temp. Lieut.-Col.) M. B. Ray; Maj. (temp. Lieut.-Col.) T. F. Ritchie; Lieut.-Col. H. S. Roch; Maj. (temp. Lieut.-Col.) A. M. Rose.

Temp. Capt. E. Scott; Lieut.-Col. (temp. Col.) D. D. Shanahan; Lieut.-Col. (temp. Col.) J. P. Silver; Maj. J. O. Summerhayes.

Lieut.-Col. A. G. Thompson; Maj. C. G. Thomson; Maj. L. V. Thurston.

Lieut.-Col. A. A. W. Watson; Lieut.-Col. (temp. Col.) B. Watts; Capt. (temp. Lieut.-Col.) G. T. Willan, H. C. Fd. Amb.; Maj. (temp. Lieut.-Col.) M. G. Winder; Maj. (temp. Lieut.-Col.) B. F. Wingate; Maj. R. N. Woodley; Capt. (temp. Maj.) W. G. Wright.

Temp. Capt. W. A. Young.

A.M.S.—Lieut.-Col. (temp. Col.) C. W. Profeit; Lieut. (temp. Col.) P. W. Sargent.

R.N. Division.—Staff-Surg. C. E. C. Stanford, R.N.

Australian A.M.C.—Lieut.-Col. G. W. Barber; Maj. J. E. Dods, M.C.; Maj. H. K. Fry; Lieut.-Col. (temp. Col.) C. H. W. Hardy, V.D.; Maj. A. H. Marks; Lieut.-Col. J. H. Phipps; Lieut.-Col. T. G. Ross; Lieut.-Col. C. G. Shaw; Lieut.-Col. J. B. St. V. Welch.

Canadian A.M.C.—Temp. Col. A. E. Snell; Lieut.-Col. W. Webster; Lieut.-Col. R. P. Wright.

New Zealand M.C.—Lieut.-Col. D. W. W. Murray.

South African M.C.—Temp. Maj. M. S. Power.

#### Military Cross.

R.A.M.C.—Temp. Capt. W. Ainslie.

Temp. Capt. D. Bell; Temp. Capt. F. G. Bell; Temp. Capt. J. F. Bourke; Temp. Capt. H. Boyers; Capt. R. Burgess; Temp. Capt. G. B. Burwell.

Capt. F. S. Carson; Capt. C. Cassidy, empld. Egypt. Army; Temporary Capt. A. B. Cheves; Capt. A. G. Clark, Spec. Res.; Capt. T. C. Clarke; Capt. H. G. Crawford, Spec. Res.; Temp. Capt. D. E. Crosbie; Capt. A. G. Cummins, empld. Egypt. Army.

Temp. Capt. W. E. David; Capt. D. Davidson; Capt. D. Dongal, Spec. Res.; Capt. T. I. Dun, Spec. Res.; Temp. Capt. J. L. Dunlop.

Capt. C. D. Edwards; Temp. Capt. E. Evans.

Capt. T. G. Fleming, Spec. Res.; Temp. Capt. C. Y. Ford; Temp. Capt. D. T. Fraser; Capt. J. Fraser, Spec. Res.; Temp. Capt. A. Fullerton.

Capt. W. G. Galwey; Capt. J. G. Gill.

Temp. Capt. D. H. Hadden; Capt. G. H. Haines, Spec. Res.; Temp. Capt. H. P. Hamilton; Temp. Capt. G. F. Hardy; Capt. W. T. Hare, Spec. Res.; Capt. W. C. Hartgill, Spec. Res.

Capt. R. L. Impey, Spec. Res.

Capt. G. G. Johnstone.

Capt. T. J. Kelly, Spec. Res.; Temp. Capt. M. B. King.

Capt. G. Q. Lannane; Temp. Lieut. J. W. Littlejohn; Temp. Capt. A. L. Lockwood; Capt. W. E. C. Lunn.

Temp. Capt. E. L. Mackenzie; Temp. Capt. W. Macleod; Temp. Capt. A. Malseed; Temp. Capt. J. C. Matthews; Temp. Capt. G. R. D. McGeagh; Temp. Capt. A. F. Menzies; Temp. Capt. K. E. Millan; Temp. Capt. F. J. Morris; Capt. G. T. Mullally, Spec. Res.

Capt. F. J. S. Ney.

Temp. Lieut. W. L. Partridge; Temp. Lieut. M. G. Pettigrew.

Temp. Capt. A. B. Raffle; Temp. Capt. A. Richmond.

Capt. G. Scott; Capt. J. A. C. Scott; Capt. F. R. S. Shaw, Spec. Res.; Temp. Capt. G. M. Shaw; Capt. H. D. Smart; Capt. W. M. Snodgrass, Spec. Res.; Temp. Capt. W. N. Soden; Capt. L. B. Stott; Temp. Lieut. D. C. Suttie.

Capt. G. P. Taylor; Temp. Capt. F. R. Thornton.

Temp. Capt. B. W. Wibberley; Temp. Capt. D. L. Williams; Capt. M. J. Williamson; Temp. Capt. I. S. Wilson; Capt. J. H. Wood.

Temp. Capt. J. M. Young.

Australian A.M.C.—Capt. J. Bentley; Capt. J. B. Birch; Capt. A. E. Colvin; Capt. E. M. Fisher; Capt. J. T. Jones; Capt. C. B. Metcalfe.

Canadian A.M.C.—Capt. A. A. Drinnan; Capt. F. W. Lees; Capt. R. M. Luton; Capt. J. E. McAskill; Capt. W. F. Nicholson; Capt. (acting Maj.) P. Poisson; Capt. W. D. S. Rorison.

Egyptian A.M.C.—El Yuzbashi (Capt.) Musa Khouri Zakharis (Effendi); El Yuzbashi (Capt.) Nasralla El Burgi (Effendi).

New Zealand A.M.C.—Hon. Capt. G. Sandham.

Also the following in connexion with the Battle of Jutland:—

#### Distinguished Service Order.

Fleet-Surg. Ernest Alfred Penfold, R.N.

Was in the fore medical distributing station when a heavy shell burst just outside, killing and wounding many. He was knocked down, bruised, and shaken, but personally assisted in the removal of the wounded and tended them with unremitting skill and devotion for 40 hours without rest. His example was invaluable in keeping up the morale of the wounded and of the medical party under very trying conditions, the shell having destroyed instruments, dressings, &c.

And the following in connexion with the Tanganyika Flotilla:—

#### Distinguished Service Cross.

Surg. Hether McCormack Hanschell, R.N.

The comparative immunity from sickness enjoyed by the members of the expedition was due to the unremitting care bestowed by Surgeon Hanschell on the health of the personnel and on the sanitary state of the camps and vessels.

In the Indian list of New Year's honours for war services the following awards are recorded:—

C.B.—Inspector-General J. C. B. Maclean, R.N. (retired).  
C.I.E.—Lieut.-Col. J. G. Hoyle, I.M.S.; Dr. M. Y. Young, medical officer at the Oil-fields, Persian Gulf.

#### MENTIONED IN DESPATCHES.

The name of Fleet-Surgeon Alfred James Hewitt, R.N., is mentioned, and he is noted for accelerated promotion, "in recognition of the conspicuous gallantry and very exceptional professional ability which he displayed as medical officer of H.M.S. *Pegasus* when that ship was sunk by the *Königsberg* in September, 1914."

#### THE SOMME CAMPAIGN.

In a thrilling despatch from General (now Field-Marshal) Sir Douglas Haig, G.C.B., Commander-in-Chief of the British Forces in France, describing the several phases of the Somme campaign, tribute is paid to the valuable work of the medical services—

The losses entailed by the constant fighting threw a specially heavy strain on the Medical Services. This has been met with the greatest zeal and efficiency. The gallantry and devotion with which officers and men of the regimental medical service and field ambulances have discharged their duties is shown by the large number of the R.A.M.C. and Medical Corps of the Dominions who have fallen in the field. The work of the Medical Services behind the front has been no less arduous. The untiring professional zeal and marked ability of the surgical specialists and consulting surgeons, combined with the skill and devotion of the medical and nursing staffs, both at the casualty clearing stations in the field and the stationary and general hospitals at the base, have been beyond praise. In this respect also the Director-General has on many occasions expressed to me the immense help the British Red Cross Society have been to him in assisting the R.A.M.C. in their work.

The health of the troops has been most satisfactory, and during the period to which this despatch refers there has been an almost complete absence of wastage due to disease of a preventable nature.

A long list of names of officers and men deserving of special mention accompanies this despatch, and the names of the medical officers included will be given in THE LANCET.

#### OBITUARY OF THE WAR.

##### ALBERT GROENWALD, M.C.,

CAPTAIN, SOUTH AFRICAN MEDICAL CORPS.

Captain A. Groenwald, of the South African Medical Corps, died at the Johannesburg General Hospital on Nov. 11th last, after having been invalided back to the Transvaal from German East Africa, where his distinguished services won him the Military Cross. The funeral took place with military honours on Nov. 13th, and among those present were Mrs. Louis Botha, and Captain Brebner representing General Botha. The South African Railways and Harbours Corps provided the firing party, and the pall-bearers were Captains of the South African Medical Corps.

##### CHARLES HUMPHRY GOW, B.A. CAMB., M.R.C.S. ENG., TEMPORARY SURGEON, ROYAL NAVAL DIVISION.

Surgeon C. H. Gow, who was killed in action on Nov. 13th last at the age at 25, was the only son of the Rev. Henry Gow, of Rosslyn Hill Chapel, London, N.W., and nephew of Dr. W. J. Gow. Educated at Wyggeston School,

Leicester, Westminster School, and Emmanuel College, Cambridge, he was completing his medical study at St. Bartholomew's Hospital when war broke out and he enlisted as a surgeon-probationer, serving for nine months on a destroyer. He then returned home to complete his medical qualification, after which he at once became surgeon in the Naval Division, serving at Gallipoli, Salonica, and France. Surgeon Gow's commanding officer wrote of him as an upright, honest, and fearless man. During his short life he gave evidence of qualities which would have carried him far.

#### DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

G. D. Massy, London Regiment, elder son of the late Lieutenant-Colonel G. Massy, I.M.S., retired.  
Second Lieut. B. Hincks, King's Royal Rifle Corps, youngest son of Dr. T. S. H. Hincks, of Hay, Hereford.  
Private F. A. Hobart, Argyll and Sutherland Highlanders, youngest son of the late Dr. N. J. Hobart, of Cork.  
Second Lieut. R. L. L. Caunter, Gloucester Regiment, younger son of Dr. R. L. Caunter, of Brewood, Staffs.  
Second Lieut. N. M. H. Atkinson, only surviving son of Dr. T. R. Atkinson, of Chadwell Heath, Essex.  
Corporal F. Rendall, The Buffs, second son of Dr. W. Rendall, late of Maiden Newton, Dorset.

We are pleased to learn from Dr. Harry P. Major that Lieut. Cyril B. Major is officially reported as "Missing" only, and not as having fallen, as recorded in THE LANCET of Dec. 23rd, 1916. It is presumed that he has been taken prisoner.

#### CANADIAN ARMY MEDICAL SERVICE.

The official report of the Special Board of Inquiry appointed to investigate the charges brought against the Canadian Army Medical Service has been published, and by it the Service has been cleared in a most welcome manner of accusations which originated from official sources and had therefore to be seriously considered. Last summer the Canadian Minister of Militia, Sir Sam Hughes, appointed Colonel H. A. Bruce Special Inspector-General of the Canadian Army Medical Service, with the duty to report on the medical work of the Canadian Expeditionary Force. Colonel Bruce and a small committee thereupon drew up a drastic indictment of the Canadian Army Medical Service, recommending complete reorganisation of the Service, and attributing considerable blame to the Director of the Service, Surgeon-General Carleton Jones. The report of Colonel Bruce's Committee proposed the concentration of Canadian sick and wounded in Canadian hospitals, and suggested that the British V.A.D. were unsuitable for the care and treatment of Canadian soldiers. Surgeon-General Carleton Jones replied to the indictment of Colonel Bruce's Committee, but Sir Sam Hughes delivered an inaccurate and mischievous address at Toronto in which he adopted, apparently, the opinions of Colonel Bruce and his co-workers. This speech caused the most poignant grief and anxiety in Canada, as it conveyed the impression that the Canadian wounded were badly treated in British hospitals.

Sir Sam Hughes having resigned his office at the request of the Canadian Premier, he was succeeded by Sir George Perley, who at once instituted a strong Special Board of Inquiry into the findings of Colonel Bruce's Committee, with Surgeon-General Sir William Babtie as president. The new Board, in a report dated Dec. 21st, while accepting some of the recommendations made by Colonel Bruce's Committee upon the work and constitution of Medical Boards, is on greater matters at absolute variance with that Committee. The Board entirely disagrees with the suggestion that the Canadian Army Medical Service should be dissociated from the British service and that Canadian sick and wounded should be concentrated in Canadian hospitals. The Board finds that the V.A.D. hospitals are well run and well cared for, and that the criticisms of these institutions as inefficient and expensive were incorrect and unjust. The work of Surgeon-General Carleton Jones and that of his staff is praised by the Special Board of Inquiry, the Director of the Canadian Army Medical Service being especially commended for hard work, tact, and zeal.

Sir William Babtie's Board, in preparing its report, has not only taken into account the evidence submitted to it, but has incorporated into some of its recommendations its own know-

ledge of conditions so far as they affect the efficiency of the Canadian Army Medical Service. The report is thus rendered additionally valuable, as in this way the reasons are forthcoming for the dissent of the Board from the findings of Colonel Bruce's Committee, and its strong support of the Director of the Service. The report shows that, while special hospital establishments were provided for Canadian sick and wounded soldiers up to February, 1916, the pooling of hospital service and administration was later made necessary by the conditions of the war, and the economy of the existing method is demonstrated by figures. The policy attributed by the Board to Colonel Bruce of a separate medical administration for Canadian soldiers "would have prevented the use of Canadian Medical Units in the Mediterranean, because Canadian troops did not happen to be employed in that theatre of the war, and the sending of Canadian hospitals to Paris for the use of the French sick and wounded." The fact that Canadian soldiers have arrived in England from Canada who are medically unfit is attributed by the Board to inexperience of recruiting matters in Canada, a situation which might have secured protest from the Director of the Medical Service.

Dr. Ernest W. White, emeritus professor of psychological medicine, King's College, London, has been appointed honorary consultant in mental diseases to the Western Command, with the temporary rank of Major, Royal Army Medical Corps.

## Medical News.

**UNIVERSITY OF LONDON.**—The Graham Legacy Committee have elected Sir Seymour Sharkey, M.D., to be their chairman for the remainder of the year 1916-17. The University Medal at the M.B., B.S. Examination for internal and external students, October, 1916, has been awarded to Graham Selby Wilson, of Charing Cross Hospital. —The Senate will proceed shortly to an appointment to the Gilchrist Studentship for Women, which is of the value of £100, tenable for one year by a graduate of the University who is prepared to take a course of study in an approved institution in preparation for some profession. Candidates must have graduated in honours in the University of London, and must be of not more than three years' standing from their first graduation.—The third ordinary general meeting of the University of London Club, Limited, was held at the Club House on Dec. 14th, 1916. Major A. M. H. Gray was elected a member of the committee.

At examinations held recently the following candidates were successful:—

**SECOND EXAMINATION FOR MEDICAL DEGREES, PART I.**  
Abbas Yousef Amer, King's College; Marjorie Muriel Sibley Bartlett, London (Royal Free Hospital) School of Medicine for Women; Arthur Bearblock, University College; Dorothy Bellows and Hylda Catherine Briscoe, London (Royal Free Hospital) School of Medicine for Women; Eila Marianne Britten, Rhodes University College, Grahamstown; Egbert Avery Lennox Crichtow, King's College; Alfred Henry Gerald Down, University College; Pinkus Joseph Freilich, King's College; Edward Gallop, St. Bartholomew's Hospital; Frank Heber and Donald Hunter, London Hospital; Margaret Gray Jones, London (Royal Free Hospital) School of Medicine for Women; Carol Pinson Lake, University College, Exeter; Mary Michael, London (Royal Free Hospital) School of Medicine for Women; James Victor Alexander Simpson, Middlesex Hospital; Dorothea Compton Wigfield, London (Royal Free Hospital) School of Medicine for Women (distinction); and David Hardy Williams, London Hospital.

**M.D. EXAMINATION.**  
**Branch IV.**, *Midwifery and Diseases of Women.*—Charles Frank Schuler, B.S., St. Thomas's Hospital.  
**Branch V.**, *State Medicine.*—Ethel Mary Minett, B.S., London (Royal Free Hospital) School of Medicine for Women; Laura Gertrude Powell, B.S., University College, Cardiff, and London (Royal Free Hospital) School of Medicine for Women; and Robert Heywood Wilshaw, B.S., Victoria University of Manchester and University College and Guy's Hospitals.

**M.S. EXAMINATION.**  
**Branch I.**, *Surgery.*—Charles Jennings Marshall, M.D., Charing Cross Hospital (University Medal).

**UNIVERSITY OF CAMBRIDGE.**—At examinations for Medical and Surgical degrees held during Michaelmas term, 1916, the following candidates were successful:—

**FIRST EXAMINATION** (October, 1916).  
**Part I., Chemistry.**—I. R. Paterson, King's; C. V. Patrick, Calus; C. M. Pollock, Trinity; J. H. Porter, Downing; W. Shaw, St. John's; H. Spibey, Downing; and T. M. Thomas, Calus.  
**Part II., Physics.**—J. H. H. Gough, Corpus Christi; I. R. Paterson, King's; C. V. Patrick, Calus; C. M. Pollock, Trinity; W. Shaw, St. John's; H. Spibey, Downing; and T. M. Thomas, Calus.

*Part III., Elementary Biology.*—I. R. Paterson, King's; C. V. Patrick Caius; and W. Shaw, St. John's.

FIRST EXAMINATION (December, 1916).

*Part I., Chemistry.*—S. J. Astbury, Sidney Sussex; G. J. V. Crosby, Christ's; A. Grant, Trinity; K. T. Liang, Caius; L. R. W. Price, Sidney Sussex; A. E. Slater, B.A., Christ's; and F. B. Sudbury, Caius. Women: J. R. Batten, Newnham; and D. A. D. Cropper, Girton.

*Part II., Physics.*—S. J. Astbury, Sidney Sussex; A. Grant, Trinity; J. H. Jones, non-Collegiate; K. T. Liang, Caius; J. H. Porter, Downing; L. R. W. Price, Sidney Sussex; F. B. Sudbury, Caius; E. R. C. Walker, Emmanuel. Women: J. R. Batten, Newnham; and D. A. D. Cropper, Girton.

*Part III., Elementary Biology.*—K. T. Liang, Caius; J. H. Porter and F. Skelton, Downing; A. E. Slater, B.A., Christ's; H. Spibey, Downing; and F. B. Sudbury, Caius. Women: J. R. Batten, Newnham.

SECOND EXAMINATION (October, 1916).

*Part II., Pharmacology and General Pathology.*—W. E. H. Banks, Clare; F. J. Bennett, B.A., Peterhouse; C. B. Clarke, Catharine; E. W. M. Dendy, B.A., Trinity; H. B. Dodwell, B.A., Emmanuel; C. Duncombe, Downing; H. V. Edwards, Trinity; L. E. Frazer, Caius; L. P. Garrad, King's; A. D. Haydon, B.A., Caius; N. S. Hewitt, B.A., and F. R. G. Hiet, B.A., Sidney Sussex; R. Hilton, Corpus Christi; H. G. G. Jeffreys, B.A., Trinity; T. A. Jones, Emmanuel; C. F. McLean, King's; E. Miller, B.A., St. John's; W. H. Palmer, Sidney Sussex; J. L. Potts, Caius; F. W. Putnam, B.A., Emmanuel; F. G. Spear, Christ's; B. W. Thompson, B.A., King's; Y.-S. Wan, St. John's; and F. G. Wood, B.A., Jesus.

SECOND EXAMINATION (December, 1916).

*Part I., Human Anatomy and Physiology.*—G. F. Abercrombie, Caius; S. T. Barrett, B.A., St. John's; T. L. Bonar, Caius; W. Breakall, Sidney Sussex; P. J. Briggs, B.A., Christ's; W. R. Carling and F. O. Coze, Emmanuel; A. do Souza, B.A., Downing; V. N. Fenton, Queens'; S. G. Galstaun, B.A., Trinity; F. B. Hobbs, Sidney Sussex; G. W. Karunaratne, Clare; P. B. Kittel, Emmanuel; G. S. Need, B.A., St. John's; J. A. P. Shaw, Trinity; J. V. Sparks, St. John's; S. D. Sturton, Emmanuel; H. Tagoe, Christ's; and H. B. Yates, Downing.

THIRD EXAMINATION (December, 1916).

*Part I., Surgery and Midwifery.*—D. J. Batterham, B.A., Caius; D. C. Beaumont, B.A., Christ's; A. D. Haydon, B.A., Caius; B. B. Jarek, Trinity; G. M. Kendall, B.A., St. John's; G. L. Maulle, B.A., Christ's; V. O. Pennell, M.A., Pembroke; D. W. R. Richardson, B.A., Caius; and F. A. Williamson, B.A., Queens'.

*Part II., Medicine, Pathology, and Pharmacology.*—C. H. Crawshaw, B.A., Christ's; H. W. Featherstone, B.A., Trinity; A. D. Haydon, B.A., Caius; H. G. G. Jeffreys, B.A., Trinity; G. M. Kendall, B.A., St. John's; C. F. Mayne, B.A., Caius; A. Orr-Ewing, B.A., Pembroke; A. A. Prichard, M.A., Clare; and T. S. Thirard, Trinity.

PUBLIC HEALTH IN BELFAST.—Our Belfast Correspondent writes: In 1916 there was a reduction of nearly 50 per cent. in the number of cases of scarlet fever notified in the previous year. On the other hand, while in 1915 only 49 cases of typhoid fever were notified, in 1916 the number rose to 123, a large proportion of the cases being in the Ballymacarrett district. Nothing has yet been done for maternal and child-welfare, but it is said a scheme is now prepared for the approval of the Local Government Board of Ireland.

DONATIONS AND BEQUESTS.—By the will of the late Miss Schaw the Glasgow Royal Infirmary has received £100,000. Other Glasgow medical institutions will receive a share of the £500,000 left by the testatrix.—The Clayton Hospital and Dispensary will receive £1000 under the will of the late Major W. H. Charlesworth, of Wakefield.—The Middlesex Hospital Cancer Ward for Women and the New Hospital for Women, Euston-road, will very considerably benefit under the will of the late Mr. Mudford, formerly editor of the *Standard*.—The late Mr. Henry Jones, of Branksome Park, Bournemouth, left by will £1000 to the Hospital for Incurables, Putney.—Colonel Thomas Edgar Jobling, of Bebside, Northumberland, has bequeathed £2000 each to the Royal Infirmary, Newcastle-on-Tyne, and the Fleming Memorial Hospital, Newcastle-on-Tyne; £1000 each to the Hospital for Incurables, Newcastle-on-Tyne, the Royal Victoria Asylum for the Blind, Newcastle, the Northern Counties Asylum for the Deaf and Dumb, the Home for Destitute Crippled Children, Gosforth.

UNIVERSITY OF MALTA: CONFERMENT OF HONORARY DEGREES.—On Dec. 16th, 1916, in the Aula Magna of the University of Malta, the degree of Doctor of Medicine, *honoris causa*, was conferred upon Colonel C. A. Ballance, C.B., M.V.O., A.M.S.; Colonel W. Thorburn, C.B., A.M.S.; Colonel A. E. Garrod, C.M.G., A.M.S.; and Colonel H. H. Tooth, C.M.G., A.M.S. This was the first conferment of honorary degrees under the provisions of a new statute, and as the Rector of the University, the Hon. Professor E. Magro, pointed out, it was the highest honour that the University was able to give. In describing the claims to such recognition of the new graduates of the University of Malta, Lord Methuen, the Governor of the Island, referred also to the services of Colonel G. L. Gulland, Colonel Charters Symonds, and Colonel Purves Stewart during their stay in Malta, and to the work of Colonel A. E. Barker, who, to the deep regret of all, gave his life for his country in Salonika. Sir Alfred Keogh, Director-General of the Army Medical Service, said his Excellency, bestowed an inestimable boon on Malta when he sent such able members of the medical profession to assist in the hospital work of the island.

THE CERTIFICATION OF SENILE PERSONS AS INSANE: A SCOTCH CONFERENCE.—In his last annual report Dr. C. J. Shaw, medical superintendent of the Royal Asylum, Montrose, deprecated the certification as insane and the transference to asylums of old people in whom mental symptoms were but the result of physical weakness and restlessness was only a terminal symptom. With adequate nursing and observation at night these old people could safely remain at home. A conference of representatives of parish councils recently took place at Montrose to discuss this question and a committee was appointed to deal with it.

## Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.

ALCOCK, ARNOLD, M.D. Lond., has been appointed Honorary Surgeon to the Gloucestershire Royal Infirmary and Eye Institution.

BOWER, H. E., M.D., C.M. Edin., Medical Officer of Health to the Runcorn Rural District Council.

DUNDAS, GRACE H. G., L.R.C.P. & S. Edin., L.R.F.P.S. Glasg., F.R.C.S.I., Medical Officer under the Child-Welfare Scheme of the Leith Town Council.

JONES, E. LLOYD, M.D., B.C. Camb., Demonstrator of Medicine at Cambridge University.

## Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index). When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BELFAST COUNTY BOROUGH MUNICIPAL SANATORIUM, Whiteabbey.—Temporary Resident Medical Superintendent. Salary at rate of £400 per annum, with board, &c.

BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.—Resident Medical Officer and House Surgeon for six months. Salaries £200 and £150 per annum respectively, with board, &c.

BOLTON INFIRMARY AND DISPENSARY.—Female Second House Surgeon. Also Female Third House Surgeon. Salaries £200 and £180 per annum, respectively, with board, &c.

BOURNEMOUTH, ROYAL VICTORIA AND WEST HANTS HOSPITAL.—House Surgeon for six months. Salary £200 per annum, with board, &c.

BRISTOL GENERAL HOSPITAL.—House Surgeon for six months. Salary at rate of £175 per annum, with board, &c.

BRISTOL, BEAUFORT WAR HOSPITAL, Fishponds.—Resident Surgical Officer. Salary £365 per annum, with board, &c.

CARDIFF, KING EDWARD VII'S HOSPITAL.—House Surgeon for six months.

CARDIFF, KING EDWARD VII. WELSH NATIONAL MEMORIAL ASSOCIATION.—Tuberculosis Physicians. Salary £500 per annum. Also Assistant Tuberculosis Physicians. Salary £350 per annum.

CARLISLE, CUMBERLAND INFIRMARY.—Resident House Physician. Salary £200 per annum; or fifth-year student, salary £100 per annum.

CHESTERFIELD AND NORTH DERBYSHIRE HOSPITAL.—Second House Surgeon. Salary £150 per annum, with board, &c.

CHILDREN'S INFIRMARY, Cleveland-street, London, W.—Female Assistant Medical Officer. Salary £250 per annum, with residential allowances.

GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon. Salary £200 per annum, with board, &c.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.—House Physician for six months. Salary 30 guineas.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.—House Surgeons, Assistant Casualty Medical Officer, and House Physician, unmarried. Salary at rate of £60 per annum each, with board, &c.

HUDDERSFIELD COUNTY BOROUGH EDUCATION AUTHORITY.—Assistant School Medical Officer. Salary £350 per annum.

INVERNESS, NORTHERN INFIRMARY.—House Surgeon or Locum Tenens. Salary as arranged, with board, &c.

MANCHESTER COUNTY ASYLUM, Prestwich.—Locum Tenens. Salary £7 1s. per week, with board, &c.

NORTHAMPTON GENERAL HOSPITAL.—House Surgeon. Salary £150 per annum, with board, &c.

NOTTINGHAM AND MIDLAND EYE INFIRMARY.—Female House Surgeon.

PADDINGTON GREEN CHILDREN'S HOSPITAL, London, W.—Clinical Assistant in Out-patients' Department.

QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E.—House Physician and House Surgeon for six months. Salary £100 per annum, with board, &c.

QUEEN MARY'S HOSPITAL FOR THE EAST-END, Stratford.—House Surgeon.

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.—Female Surgical Registrar.

ROYAL NATIONAL ORTHOPAEDIC HOSPITAL, 234, Great Portland-street, W.—Resident Surgical Officer.

ST. GEORGE'S HOSPITAL, Hyde Park Corner, S.W.—Surgical Registrar. Salary £200 per annum.

SCOTTISH WOMEN'S HOSPITALS, 2, St. Andrew-square, Edinburgh.—Assistant Medical Officers for Serbian Unit in Russia. Also Assistant Surgeon for Serbian Unit in Macedonia. Salary at rate of £200 per annum, with board, &c.

SHEFFIELD ROYAL HOSPITAL.—Assistant House Surgeon, unmarried. Salary £120 per annum, with board, &c.

SOUTH LONDON HOSPITAL FOR WOMEN, 103, South Side, Clapham Common, S.W.—Female House Physician for six months. Salary at rate of £100 per annum, with board, &c.

VENTNOR, ISLE OF WIGHT, ROYAL NATIONAL HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST ON THE SEPARATE PRINCIPLE.—Assistant Resident Medical Officer.  
VICTORIA HOSPITAL FOR CHILDREN, Tite-street, Chelsea, S.W.—Honorary Dental Surgeon.  
WELSH METROPOLITAN WAR HOSPITAL, Whitchurch, near Cardiff.—Resident Medical Officer.  
WESTMORELAND SANATORIUM, Meathop, Grange-over-Sands.—Second Assistant Medical Officer. Salary £200 to £250 per annum, with board, &c.

THE CHIEF INSPECTOR OF FACTORIES, HOME OFFICE, LONDON, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Esher, Surrey; Lydbrook, Glos.; and Hull, Yorks.

## BIRTHS, MARRIAGES, AND DEATHS.

### BIRTHS.

ATKINSON.—On Dec. 24th, at Hoefield House, Carlisle-avenue, Plymouth, the wife of Surgeon C. H. Fairbank Atkinson, R.N.V.R., of a daughter.  
BIGGS.—On Dec. 1st, at York House, Blenkarne-road, Wandsworth Common, the wife of Major George Nixon Biggs, R.A.M.C.T., of a son.  
INGOLBY.—On Dec. 16th, at Lahore, India, the wife of Captain C. M. Ingolby, R.A.M.C., of a son.  
JONES.—On Dec. 30th, at Hillview, Grove Park, Kent, the wife of Captain Sydney H. Jones, R.A.M.C., of a daughter.  
LAPAGE.—On Dec. 9th, at 194, Wilmslow-road, Withington, Manchester, the wife of C. P. Lapage, M.D., Captain, R.A.M.C., T. (*à la suite*), of a son.  
MACMANUS.—On Dec. 31st, at The Cottage, Granville Park, Blackheath, the wife of Captain Desmond MacManus, R.A.M.C., of a son.  
PEACOCK.—At the Epsom Nursing Home, on Dec. 27th, the wife of W. Baly Peacock, M.R.C.S. Eng., L.R.C.P. Lond., of Bracklesham, Epsom, of a daughter (Joan Elizabeth).  
ROOKE.—On Dec. 24th, at Knole-road, Bournemouth, the wife of A. Basil Rooke, F.R.C.S., of a son.

### MARRIAGES.

ABRAHAM—CAKETT.—On Dec. 21st, at the Parish Church, Crowhurst, Sussex, Everard Cecil Abraham, Captain R.A.M.C., to Dorothy Trease Cackett, daughter of the late Edward and Beasie Cackett, of Canterbury.  
GORDON—POWER.—On Dec. 27th, in London, Hon. Lieutenant-Colonel Mervyn Henry Gordon, M.D., R.A.M.C., to Mildred Olive, daughter of the late Sir William Power, K.C.B., F.R.S.  
HARWOOD—PAIN.—On Dec. 31st, at St. Matthew's, Newington, Captain L. A. Harwood, R.A.M.C., to Lily Fanny, eldest daughter of Dr. and Mrs. Pain, New Kent-road.  
SCOTT—BURNS.—On Dec. 30th, 1916, very quietly, at S. Mary's, Finchley, Eric Arnold Scott, temporary Captain, R.A.M.C., only son of Albert G. Scott, Glenroy, Seymour-road, Finchley, to Margaret Jessie Burns (Madge), daughter of the late J. B. Burns, of Rugeley.

### DEATHS.

BARWELL.—On Dec. 27th, at Norwich, Richard Barwell, F.R.C.S., Consulting Surgeon to Charing Cross Hospital, aged 90 years.  
ORANGE.—On Dec. 31st, at Marina-court, Bexhill, William Orange, C.B., M.D., formerly Superintendent of Broadmoor Asylum, aged 83.  
SALTER.—On Dec. 21st, at Higher Summerlands, Exeter, John Reynolds Salter, M.R.C.S., L.S.A., in his 91st year.  
SHILLITO.—On Dec. 23rd, at Ardverns, 3, Richmond-gardens, Bournemouth, Buxton Shillitoe, F.R.C.S., late of 2, Frederick's-place, Old Jowry, E.C., in his 91st year.  
SMITH.—On Dec. 21st, at Dover House, Southsea, Henry Robert Smith, I.R.C.P. & S., aged 74 years.  
SUTHERLAND.—On Dec. 23rd, at 33, Trafford-road, Salford, Manchester, Wm. Leith Ireland Sutherland, M.B., C.M., aged 61.  
N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

## METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Jan. 3rd, 1917.

Date.	Rain-fall.	Solar Radio in Vacuo.	Maxi- mum Temp. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Remarks.
Dec. 28	...	53	53	31	34	34	Foggy
.. 29	0.27	57	55	34	53	53	Overcast
.. 30	0.17	69	53	49	48	49	Cloudy
.. 31	...	67	54	46	49	51	Overcast
Jan. 1	0.04	69	56	50	49	50	Overcast
.. 2	...	60	54	49	48	49	Fine
.. 3	...	65	54	49	51	52	Overcast

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

The following journals, magazines, &c., have been received:—American Medicine, Clinical Medicine, Medical Review of Reviews, Journal of the Missouri State Medical Association, Mercy and Truth, Medical Journal of South Africa, Archives of Internal Medicine, Indian Journal of Medical Research, Archives de Médecine et de Pharmacie Militaires, Prescriber, Dominion Medical Monthly, American Journal of Surgery, Medico-Legal Journal, Journal of Scottish Meteorological Society, Proctologist and Gastroenterologist, Journal of Nervous and Mental Diseases, Annali di Medicina Navale e Coloniale.

## Notes, Short Comments, and Answers to Correspondents.

### MILK IN THE DIET OF INFANTS.

To the Editor of THE LANCET.

SIR,—The letter of your correspondent "M.D., M.R.C.P." in THE LANCET of Dec. 30th, 1916, does not supply sufficient evidence to determine the method to be adopted of solving the problem he propounds. The phenomenon of milk causing retching may be due to one of two causes—an idiosyncrasy towards cow's milk or intense disgust. One instance of the former has come under my notice, though in a younger child. An infant, aged 7 months, was brought for advice on weaning, as any form of cow's milk—dried, peptonised, or merely dilute—gave rise to coryza, bronchitis, and an urticarial rash with digestive disturbance. This sequel to the taking of milk I personally verified, and the reaction to 3 ounces of milk was most striking.

Recollecting a case of idiosyncrasy to eggs published in your journal a few years ago, I adopted the line of treatment there used with success—that of producing toleration to minute quantities of the offending substance, and then gradually increasing the amount. Finding that a mixture of water, albumactin, and lactose caused no disturbance, a minute quantity of cream—5 minims to 3 ounces—was added and a feed of this was given once daily. As the slight disturbance caused gradually lessened the amount of cream was increased, and finally, after three months, the child was able to take a fair quantity of milk and weaning was accomplished.

I do not discuss what may have been the actual factor causing the intoxication or why this particular mixture was adopted at the outset of treatment. Disgust would seem to be the more probable cause in your correspondent's case. It is common for children to evince great repulsion towards certain foods, and if they are taken under compulsion retching and even vomiting may follow. Even more, I have met children who would announce that if a certain article of diet were forced upon them, they would be sick and they always carried out their threat. Frequently the hostility is only evinced towards one form of milk and may be overcome by presenting that food in other forms, as in soups, puddings, milk jelly, or flavoured with cocoa, for which purpose cocoa husks are useful, of which the devising will fall upon the ingenuity of mother and nurse.

It must be acknowledged that it is difficult to ensure a quart of milk being taken daily in these ways, and if it proves impossible the protein and fat content of the diet must be increased by allowing additional eggs and butter or by the use of one of the proprietary preparations, such as virol, the intake of fluid being kept up to the requisite amount by giving water to drink in place of milk. The arrangement and regulation of such a diet can only be undertaken by one having a personal knowledge of the child and able to keep the progress of events under observation, for no child which presents such difficulty in feeding can be fed on a rule-of-thumb method.

I am, Sir, yours faithfully,  
Upper Wimpole-street, W., Jan. 1st, 1917. DOUGLAS FIRTH.

### "INDEX DOSURINE CASE."

THE Anglo-French Drug Company, Limited, of Gamage Building, Holborn, London, E.C., have brought to our notice the "Index Dosurine Case," which is a compact pocket outfit for the testing of urine for sugar and albumin. It contains a series of ampoules filled with a convenient quantity of the sugar and albumin reagents. A small pipette and two test-tubes are also provided. Some small pellets which prevent the liquid from bumping when being brought to the boil are included in the outfit. This set reduces the testing of the urine for sugar and albumin to a very simple matter and will be very useful for bedside work. An ordinary candle-flame is sufficient for heating the fluids.

### PILEWORT.

To the Editor of THE LANCET.

SIR,—Can any of your readers kindly tell me something about the use of "pilewort"? Quite recently I have met persons suffering from haemorrhoids who informed me that they had used to their great relief a certain secret ointment. I have purchased a pot of this ointment, which I have reason to believe has "pilewort" as an essential ingredient. On application the ointment causes a numbing astringent sensation, slightly discomforting at first but quickly passing away.

According to Stedman's Medical Dictionary, "Wort—(A.S. Wyrt) a suffix in the popular names of many plants such as liverwort, lungwort, woundwort, &c.;

also means an infusion of malt." The distinctive botanical characters of the "worts" and their uses are described in "Potter's Cyclopaedia of Botanical Drugs and Preparations," second edition, by R. C. Wren, F.L.S., with additions by E. M. Holmes, F.L.S., but as I am only dealing specifically with "pilewort," I quote from this Cyclopaedia: "Pilewort—*Ranunculus Ficaria*, Linn., N.O. *Ranunculaceæ*. Syn.—Small Celandine, Lesser Celandine. Part used, herb. Action, astringent. As its name denotes, it is chiefly used for piles, for which it is almost a specific. Internally, the infusion of one ounce in a pint of boiling water is taken in wineglassful doses. Generally this is sufficient to cure most cases. Externally it can be used with advantage as an ointment applied locally night and morning." Then follows the distinctive botanical characters.

Now, Sir, it does appear to me that if these "worts" have any real medicinal properties, such as I believe the "pilewort" to have, why not add them to the Pharmacopœia, as many other remedies have from time to time been added to the "Book" containing the official list of medicines and compounds.—I am, Sir, yours faithfully,

FREDK. W. ALEXANDER,  
Medical Officer of Health, Metropolitan Borough of Poplar.  
Dec. 20th, 1916.

\*\* Pilewort ointment is still made, in part owing to the advocacy of Sir James Sawyer (*Birm. Med. Rev.*, May, 1901), though medicine has found the claims of the plant invalid. The botanical name is *Ranunculus ficaria*, but it was mentioned by John Gerard in his "Herball," published in 1597, as *Chelidonium minus*, or the "lesser celandine." Although it is a buttercup, and an entirely different plant from the greater celandine (the poppy order), the "lesser celandine" is the name that endures to-day, and Wordsworth under this name devoted a poem to the little flower. Culpeper in his "Herball" (about 1653) praises it, and within the last century it has been recommended in medicine in the following terms: "The leaves are antiscorbutic and the root reckoned a specific if beat into cataplasms and applied to the piles." But 50 years later we observe a change, as the editor of Lindley's works says: "Confident as are these assertions (those of Culpeper and others), yet the use of the plant is all but discontinued in the present day, medical practitioners properly looking for sounder principles than those derived from the doctrine of similitudes." The editor further states: "The trivial name of pilewort bestowed upon this plant from the structure of those tubercles (of the root) which show in small bundles of small tubers so like the shape of those excrencences which occur in the more distressing cases of piles that our forefathers who chose their medicines not from knowledge of the properties and qualities of plants, but from a kind of fancy as to Nature's external impress indicating the innate virtues, adopted it as a remedy for this malady." Pilewort flowers in early spring, and the roots form fasciculated knobs (hence the name *ficaria*, like figs).—ED. L.

#### THE QUESTION OF PROHIBITION.

To the Editor of THE LANCET.

SIR,—Fleet-Surgeon W. E. Home, in his letter in your issue of Dec. 23rd, 1916, advocates "closing all licensed houses till the war ends." How does he explain the hard fact that the heaviest beer-drinkers in Europe have, so far, proved themselves to be the bravest and most successful fighters in this war? In our victorious wars of the past, naval or otherwise, the British drank beer as much as anyone. Prohibition theories do not seem to square with the teachings of military history.

I am, Sir, yours faithfully,

H. N. ROBSON.  
Junior Constitutional Club, Piccadilly, W. Dec. 29th, 1916.

#### A MEDICAL PHILOLOGIST.

MEMBERS of the medical profession who are Esperantists, or who are interested in the auxiliary language which is receiving increased attention at the present moment owing to its utility as an instrument of social, professional, and commercial intercourse, will read with pleasure an interesting sketch of Dr. Zamenhof which appears in the *Times* of Dec. 30th, 1916, in the Russian Section. Dr. Zamenhof, the inventor of Esperanto, was born at Bialystok in 1859, and though physically delicate, his intellect developed quickly, for he was able to read and write well at the age of four. Having qualified in medicine, he specialised in ophthalmology, studying for this purpose at Vienna, and ultimately taking up practice in Warsaw in 1886. In the following year he published his first text-book of an international language under the pseudonym of Dr. Esperanto, one who hopes, a name which subsequently became attached to the language itself. The language gradually began to spread in Russia, Germany, Sweden, Poland, and France, but did not take root in Britain till 1902. In 1905 an Esperanto Congress was held

at Boulogne-sur-Mer, which was attended by delegates from all parts of the world, when the practicability of the language was clearly established. Other congresses have been held at Cambridge, Dresden, Barcelona, Washington, Antwerp, and Cracow, and in connexion with them Dr. Zamenhof has been made a Chevalier of the Legion of Honour, and received the Order of Isabella the Catholic, and many other distinctions. The author of Esperanto, who is now suffering from heart disease, devotes all his spare time to Esperanto, and has translated into that language many classics of the leading countries, as well as the whole of the Old Testament from the Hebrew original.

#### IRISH NURSES AND THE COLLEGE OF NURSING, LIMITED.

To the Editor of THE LANCET.

SIR,—In THE LANCET of Dec. 16th the secretary of the College of Nursing, Limited, intending to correct a statement made by me in your previous issue, states that "on reference to the Memorandum and Articles of Association it will be seen that membership of the College is strictly limited to nurses who possess a certificate of proficiency in general [italics in original] nursing (medical and general), and it is the members who govern the College." I have been unable to verify the secretary's statement. Paragraphs 3(D) and 3(E) of the Memorandum of Association deal with the granting of "certificates of proficiency in nursing" and of "certificates of training and proficiency in nursing," do not use the word "general," which is italicised by Miss Rundle, nor do they describe the nursing as "medical and surgical." Moreover, Paragraph 3 (I) makes it clear that the Council is not to be limited in its giving of certificates by the terms of the preceding paragraphs. The first paragraph of the Articles of the Association which deals with the definition of "members" of the College (No. 5) reads: "The subscribers hereto shall be members of the College." The subscribers are seven gentlemen, none of whom surely "possesses a certificate of proficiency in general nursing (medical and surgical)." The next paragraph of the Articles (No. 6) defines certain further qualifications for membership of the College other than being upon the Register.

If the secretary of the College of Nursing, Limited, can refer precisely to any paragraphs in the Memorandum or Articles which support the statements made in the letter to THE LANCET she will be doing a service to the College.

I am, Sir, yours faithfully,

Dec. 19th, 1916. ONE OF YOUR IRISH CORRESPONDENTS.

R. H. W.—An official communication on Trinitrotoluene Poisoning appeared in THE LANCET of Dec. 16th, 1916, and was the subject of a leading article in the same issue. The Physiological Effects of Nitroglycerine are dealt with briefly by Hale White ("Materia Medica," fifteenth edition, Churchill, 1916, p. 317), and Bruce and Dilling ("Materia Medica," tenth edition, Cassell, 1915, p. 299); and at greater length by Cushny ("Pharmacology," sixth edition, Churchill, 1915, p. 387).

COMMUNICATIONS not noticed in our present issue will receive attention in our next.

## Medical Diary for the ensuing Week.

#### SOCIETIES.

SOCIETY FOR THE STUDY OF INEBRIETY, Rooms of the Medical Society of London, 11, Chandos-street, Cavendish-square, W.  
TUESDAY.—3.30 P.M., Council Meeting, 4 P.M., Discussion on Alcoholism and Child Welfare in War Time (opened by Sir John Kirk, J.P.).

HUNTERIAN SOCIETY, at the Royal Society of Medicine, 1, Wimpole-street, W.

WEDNESDAY.—8.30 P.M., Council Meeting, 9 P.M., Hunterian Lecture.—Mr. J. W. T. Walker: The Bladder in Gunshot and other Injuries of the Spinal Cord.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY, West London Hospital, Hammersmith-road, W.  
FRIDAY.—8 P.M., Special Clinical Evening.

#### LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations. Dr. Simson: Diseases of Women.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

- FRIDAY.**—10 A.M., Dr. Simson: Gynaecological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
- SATURDAY.**—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.
- NORTH-EAST LONDON POST-GRADUATE COLLEGE,** Prince of Wales's General Hospital, Tottenham, N.
- MONDAY.**—Clinics:—10.30 A.M., Surgical Out-patients (Mr. H. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham); Gynaecological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leslie).
- TUESDAY**—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting).
- WEDNESDAY.**—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M., Eye Operations (Mr. R. P. Brooks).
- THURSDAY.**—2.30 P.M., Gynaecological Operations (Dr. A. E. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leslie).
- FRIDAY.**—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. H. Gillespie); Eye Out-patients (Mr. R. P. Brooks).
- THE THROAT HOSPITAL,** Golden-square, W.
- MONDAY.**—5.15 P.M., Special Demonstration of Selected Cases.
- TUESDAY.**—5.15 P.M., Clinical Lecture.
- ST JOHN'S HOSPITAL FOR DISEASES OF THE SKIN,** 49, Leicester-square, W.C.
- TUESDAY.**—4 P.M., Dr. J. L. Bunch: The Treatment of Syphilis. 6 P.M., Dr. W. K. Sibley: Syphilis and its Treatment.
- THURSDAY.**—6 P.M., Chesterfield Lecture:—Dr. M. Dockrell: The Early Lesions of Syphilis and their Treatment.
- ROYAL INSTITUTION OF GREAT BRITAIN,** Albemarle-street, Piccadilly, W.
- Christmas Lectures:—The Human Machine which All must Work (adapted to a Juvenile Audience).
- TUESDAY.**—Prof. A. Keith: Living Wires and Central Exchanges.

### EDITORIAL NOTICES.

It is most important that communications relating to the Editorial business of THE LANCET should be addressed exclusively "To the EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, and when accompanied by blocks it is requested that the name of the author, and if

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THE  
Horace Dobell Lecture  
ON THE

MECHANISM OF THE SERUM REACTIONS

*Delivered before the Royal College of Physicians of London on Nov. 7th, 1916,*

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MR. PRESIDENT AND GENTLEMEN.—The serum reactions are those which take place between an antigen and its homologous antiserum. Of the chemical nature of antigens we have no certain knowledge. Examples are bacteria and their products, red cells and blood serum when injected into an animal of different species. Substances capable of acting as antigens appear to be attached to protein matter and have not as yet been isolated in a pure state. Attempts have been made to show that antigens are of a lipid nature. Antigen-containing substances have been extracted with alcohol and ether, and the material obtained after evaporation of the solvent has been injected into animals (Bang and Forssman, 1906, and others). The results obtained have not been conclusive (Ritchie and Miller, 1913). In this connexion it must be remembered that antigens are active in very small amounts, and that an ethereal solution of lipoids, although apparently perfectly clear, may well contain minute fragments of protein matter in suspension. Moreover, substances not usually soluble in fat solvents may be dissolved or taken up as a very fine suspension in the presence of lecithin. A chloroform solution of lecithin is able to take up or dissolve such substances as cobra venom, trypsin, rennet, and even oxide of iron. In no case, so far as I am aware, has the injection of a pure substance of well-defined chemical constitution been followed by the formation of antibodies. Our definition of antigen is a substance the introduction of which into the animal body is followed by the formation of a specific antibody.

It is usually held (Pick, 1902) that the antibodies are for the greater part precipitated with the globulins of the serum, with the pseudoglobulin fraction in the case of the horse, with the euglobulin fraction in the case of the goat. Moreover, an increase in the globulins of the serum during the process of immunisation has, on several occasions, been observed. It is, however, probable that euglobulin and pseudoglobulin merely represent different phases of physical aggregation of their constituent particles, and the difference between even albumin and globulin may be of a physical rather than chemical nature. From this point of view, the fact that the greater part of the antibody in a serum is precipitated with any particular fraction of globulin yields no information as to the chemical nature of the actual antibody. As a matter of fact, it was shown by Ledingham (1907) that the ratio of distribution of antitoxin among the various serum proteins—euglobulin, pseudoglobulin, and albumin—differed considerably at different stages of the process of immunisation. We may suppose that the process of immunisation is accompanied by a disturbance of the physical state of the serum proteins, and the regrouping of protein molecules may lead to an increase in the globulin fraction.

As to the chemical nature of antigen and antibody we are in complete ignorance. When, however, antigen is mixed with antibody a reaction takes place, and the occurrence of this reaction can be shown by certain phenomena known as the serum reactions. These reactions are: 1. *The precipitation reaction.* When a normal serum or a bacterial extract is mixed with its homologous antiserum a precipitate is formed. 2. *The agglutination reaction.* When a suspension of red blood corpuscles or bacteria is mixed with homologous antiserum the bacteria or cells are agglutinated to form clumps. 3. *Lysis.* When red corpuscles or bacteria are mixed with antiserum or complement the cells are dissolved, or at any rate some change takes place which leads to the escape of the intracellular contents. 4. *Complement fixation.* When antigen is mixed with antiserum and complement, the complement is used up, and if subsequently there be added a mixture of red blood corpuscles and homologous antiserum the fixation of the complement can be demon-

strated by the absence of haemolysis. 5. *The opsonic reaction.* If red cells or bacteria are treated with antiserum the cells or bacteria are so altered that they are more readily ingested by phagocytes. This reaction is more marked in the presence of complement.

THEORIES IN EXPLANATION OF THE SERUM REACTIONS.

Two main theories have been advanced to explain these reactions: the theory of Ehrlich and the theory of Bordet. The former theory assumes a chemical union between the antigen and the antibody; the other interprets the reactions as adsorption phenomena in which the antibody is adsorbed by the antigen. In spite of some opposition, the theory of Ehrlich has acquired a dominant position in medical literature, and its general outline is familiar to all who have even the scantiest knowledge of medical sciences.

According to the views of the Ehrlich school each of the serum reactions is due to the existence of a separate and particular antibody. These various and hypothetical antibodies have been arranged in three classes. *Receptors of the first order:* To this class belong the antitoxins, which possess a haptophore group, a grouping of atoms capable of satisfying the affinities of the corresponding grouping in the haptophore molecule of the homologous toxin. The toxin molecule is thus rendered harmless, for it is no longer able to combine with the cells of the body. *Receptors of the second order:* These have, in addition to the haptophore group, a second group, the ergophore group, which by virtue of its chemical constitution is able to bring about the change peculiar to the particular type of antibody. To this class belong the precipitins and agglutinins. The haptophore group of the agglutinin combines with the bacterium, and subsequently the ergophore group proceeds to produce agglutination. *Receptors of the third order:* In addition to the haptophore group the antibodies possess a complementophile group, which combines with a substance called complement which is necessary to complete the lysis of a corpuscle or bacterium. The antibodies concerned in the complement-fixation reaction are held by many to constitute a separate class of amboceptor, and the opsonins or bacteriotropins are also considered to belong to this group.

It is assumed, then, that each serum reaction is an entirely separate and distinct phenomenon, the result of the action of a highly specialised chemical substance expressly manufactured for the purpose. A precipitin is a body which combines with homologous antigen, and then by virtue of a special chemical formula proceeds to precipitate it. It is entirely distinct from the complement-binding amboceptor, which is structurally adapted to perform the specific function of complement fixation. It is manifest that the side-chain theory affords no explanation whatever of the mechanism of the serum reactions. It may, as a matter of mere terminology, be convenient to say that any serum contains an agglutinin for *B. typhosus*, but the process of agglutination is in no way explained by saying that the agglutinin possesses two groups, the one a haptophore which combines with the bacillus, the other an ergophore which produces agglutination. We already know that clumping occurs and that the reaction is specific. Ignorance, however aptly veiled in an attractive terminology, remains ignorance.

With each addition to the store of experimental fact new substances have been imagined and endowed with the appropriate functions. To difficulties in the interpretation of the reaction between toxin and antitoxin we owe the coining of such words as prototoxin, syntoxoid, and epitoxoid. The observation that bacteriolysis does not occur in the presence of a great relative excess of antiserum led Neisser and Wechsberg (1901) to elaborate the hypothetical conception of complement deviation<sup>1</sup> (*Komplement-Ablenkung*). The experimental facts are explained in this case by supposing that free amboceptors have a greater affinity for complement than those which have effected union with the receptors of the bacillus. Ferrata (1907) showed by precipitating the euglobulin of fresh serum that two substances appeared to be necessary for complement action. The names mid-piece and end-piece fraction of the complement were accordingly coined, and the diagrams which accompany Brand's article (1907) are examples of the attempt to make new experimental data conform to the limits of a ruling hypothesis.

<sup>1</sup> Complement deviation (*Ablenkung*) should not be confused with the more familiar complement fixation (*Bindung*).

A theory, right or wrong, is of value as long as it tends to progress and further investigation, and it is notorious that the researches of Ehrlich and his school have yielded results of high theoretical interest and great practical value, in the realms alike of diagnosis and therapeutics. Nevertheless, the outstanding genius of Ehrlich and the greatness of his discoveries have tended to give to the theory associated with his name a position comparable to that of a well-known law of physical or biological science. New observations have been held to be explained if they were shown to be consistent with the side-chain hypothesis. But agglutinins, precipitins, amoebocytes are mere words, and a passive belief in the existence of such bodies tends to impede rather than advance our understanding of what is actually taking place. In our present state of ignorance of the nature of the reaction it seems undesirable to use a terminology which implies a knowledge which we do not possess.

We know that when substances containing antigens are mixed with substances containing antibodies a change takes place, and we can obtain indirect evidence of this change by observing certain phenomena such as precipitation, agglutination, or lysis. It seems to me probable that these phenomena are the result of one fundamental reaction which takes place between antigen and antibody. The so-called serum reactions, precipitation, agglutination, lysis, complement fixation, and the opsonic reaction constitute different methods for the indirect observation of one reaction which underlies and is essential to them all.<sup>2</sup> They are, in fact, accessory phenomena, and their demonstration is dependent on accessory characteristics in the reagents which we employ. For all the reactions which can be demonstrated in a test-tube it is only necessary to postulate one kind of antibody.

#### PRECIPITATION.

This is a reaction which is usually demonstrated by mixing antiserum with an antigen-containing fluid. According to the side-chain hypothesis the antiserum contains an active substance, the precipitin which precipitates the antigen, called in this reaction the precipitinogen. That any person who had carried out many precipitation reactions should continue to hold this view is not a little surprising. In practice relatively large amounts of antiserum are invariably employed, while the antigen-containing serum may be employed in quantities of 0.0001 c.c., 0.00001 c.c., or in exceptional cases still smaller amounts. That a fairly abundant and easily visible precipitate could be derived from such a minute quantity of antigen is scarcely conceivable. It is to Welsh and Chapman (1906 to 1910) that we owe a most important observation on this subject. These workers showed by gravimetric methods that, under the usual experimental conditions, the greater part, if not all of the precipitate was derived from the antiserum. Table I., abbreviated from a paper in the Proceedings of the Royal Society (1907) by Welsh and Chapman, illustrates this point.

TABLE I.

No. of experiment.	Weight of egg-white homologous protein (dried).	Amount of antiserum (fresh).	Weight of precipitum (dried).
1	2.5 mg.	19 c.c.	18.0 mg.
2	2.5 mg.	20 c.c.	18.0 mg.
5 (a)	1.0 mg.	18 c.c.	13.0 mg.
5 (b)	Superfluid of 5 (a).	16 c.c.	8.5 mg.
5 (c)	" " 5 (b).	18 c.c.	4.4 mg.

In experiment (1) 2.5 mg. dried hen egg-white interacted once with 19 c.c. fresh hen egg antiserum and caused the formation of a deposit weighing 18 mg., or more than seven times the weight of the homologous protein concerned. In experiment (5) 1 mg. of dried hen egg-white, interacting (a) with 18 c.c. fresh hen egg antiserum, brought down a deposit of 13 mg. The residual protein in the clear superfluid, interacting (b) with 16 c.c. of a second fresh hen egg antiserum, gave a further deposit of 8.5 mg. The resulting superfluid, again interacting (c) with 18 c.c. of a third egg antiserum, gave a third deposit of 4.4 mg. Thus by allowing 1 mg. of the homologous protein to interact successively with three antisera (which did not mutually interact), a total deposit of 25.9 mg. was obtained.

<sup>2</sup> The reaction which takes place between toxin and antitoxin is not accompanied by any change which can be demonstrated *in vitro* and appears to be of a somewhat different nature to that which takes place in the serum reactions, which are here considered.

On the other hand, the weight of the precipitate is directly proportional to the amount of antiserum, provided that the mixture contains sufficient antigen to precipitate all the precipitable matter in the antiserum. This second point is illustrated in Table II., taken from Chapman's paper in the Proceedings of the Royal Society (1910).

TABLE II.

Weight of dried egg-white.	Volume of antiserum.	Weight of precipitate.	Weight of precipitate from 1 c.c. antiserum.
14.4 mg.	2 c.c.	3.2 mg.	1.6 mg.
36.0 mg.	2 c.c.	3.5 mg.	1.75 mg.
144.0 mg.	2 c.c.	3.4 mg.	1.7 mg.
432.0 mg.	2 c.c.	3.4 mg.	1.7 mg.

If, however, the mixture contains an insufficient quantity of antigen precipitation is incomplete and a smaller precipitate is obtained. The proof given by Welsh and Chapman that under the usual experimental conditions it is the antiserum which is precipitated by the antigen is of far-reaching importance. It casts an entirely fresh light not merely on the precipitation reaction, but on the other serum reactions as well.

Before leaving the subject of precipitation it is necessary to refer to the importance of the relative proportions of antigen and antiserum in the mixture. The importance of this factor is shown in Table III. (Dean, 1911):—

TABLE III.

	5 c.c. dilutions of normal horse serum (antigen).	5 c.c. of a 1 in 5 dilution of rabbit v. horse serum (antibody).	5 c.c. of a 1 in 10 dilution of rabbit v. horse serum.	5 c.c. normal saline solution.
1	Undiluted serum.	70 c.m.m.	5 c.m.m.	Clear.
2	Diluted 1 in 2	140 "	30 "	"
3	1 in 4	190 "	65 "	"
4	1 in 8	200 "	80 "	"
5	1 in 16	110 "	120 "	"
6	1 in 32	69 "	60 "	"
7	1 in 64	40 "	25 "	"
8	1 in 128	30 "	15 "	"
9	1 in 256	20 "	7.5 "	"
10	1 in 512	10 "	5 "	"
11	1 in 1024	7.5 "	Less than 5 "	"
12	5 c.c. normal saline solution.	Clear.	Clear.	—

Three sets of dilutions of horse serum were prepared. To one set was added an equal quantity of a 1 in 5 dilution of antiserum, to another set was added a 1 in 10 dilution of the antiserum. The third set received an equal quantity of normal saline solution, and acted as an antigen control. The antiserum controls are shown in the tubes numbered 12. All the tubes were incubated for four hours at 37°C., and then placed overnight in the cold room. The tubes were then centrifuged for one hour. The tubes ended in a narrow portion, which was calibrated in such a way that the amount of the precipitate could be accurately determined. The relative quantities of the precipitate in each tube are indicated by the figures, which give the volume of the precipitate in cubic millimetres.

With a 1 in 5 dilution of antiserum the largest precipitate was obtained by adding a 1 in 8 dilution of antigen. With half the quantity of antiserum (1 in 10) the largest precipitate was obtained by adding a 1 in 16 dilution of antigen. The largest precipitate obtained with the 1 in 10 dilution of antiserum was about half the largest amount obtained by the use of twice as much antiserum (1 in 5 dilution). For any quantity of antiserum there exists a quantity of antigen which is capable within a definite period of time of producing the largest precipitate obtainable from such a quantity of antiserum. Table III. also illustrates very clearly the inhibitory effect of relative excess of antigen. This is plainly seen by comparing the figures in the two columns. A 1 in 4 antigen dilution, which constituted a marked antigen excess for an equal quantity of 1 in 10 antiserum, produced almost the largest precipitate of the series when mixed with a 1 in 5 dilution of antiserum.

The relative proportions of antigen and antibody constitute a factor which is present in all the serum reactions. This influence of relative proportions suggests an analogy with the precipitate which is formed when an electro-positive is mixed with an electro-negative colloid. In this case, if the proportions are optimal, both colloids are completely precipitated. If either constituent is present in relative excess precipitation is incomplete. Moreschi (1906) concluded as

the result of a series of experiments that precipitin and precipitinogen unite in variable proportion to form a series of precipitates. This result is at variance with the conclusions of Welsh and Chapman. The matter is one which merits further investigation.

If, then, antigen is mixed with antibody there follows an aggregation of particles, with the formation in all probability of an adsorption compound. This aggregation is an essential part of the mechanism of all the serum reactions, not merely of the precipitin reaction, but also of agglutination, lysis, complement fixation, and in all probability the opsonic reaction. If sufficient antiserum is used, and if the proportions of antigen and antibody are correctly adjusted, there is formed a bulky and flocculent precipitate. If the mixture contains a relative excess of either antigen or antibody the aggregation process is less complete. Here it may be mentioned that the ordinary method of performing the test in which a few cubic centimetres of the mixture are placed in an ordinary test-tube is not an ideal method of observing a finely-divided precipitate. A mixture of antigen and anti-serum which looks as clear as water in an ordinary test-tube may appear opalescent or even turbid if viewed through the length of a polarimeter tube.

#### THE RELATION BETWEEN THE FORMATION OF A PRECIPITATE AND THE FIXATION OF COMPLEMENT.

Complement fixation, which since the introduction of the Wassermann reaction has become comparatively familiar, was first observed by Bordet and Gengou in 1901. Interest in the subject was revived by Neisser and Sachs (1905), who elaborated a practical method for the identification of the blood of different kinds of animals. As to the explanation of the phenomenon considerable controversy has taken place. Gay (1905) came to the conclusion that the formation of a precipitate was the essential cause of the disappearance of complement. Neisser and Sachs, on the other hand, found that the amount of the precipitate and the amount of complement fixed stood in no direct proportions. They were able to observe marked fixation of complement in mixtures in which no precipitate could be recognised. They considered that the complement united with the complementophile group of an amboceptor, in strict accordance with the theories of Ehrlich. The view was accordingly propounded that precipitation and complement fixation were separate and independent phenomena. Muir and Martin (1906) found that the fixation of complement was, as a rule, closely associated with the formation of a precipitate, but were not convinced that precipitation formed a complete explanation of complement fixation. They cited as an instance a rabbit *v.* guinea-pig serum which produced, when mixed with its homologous antigen, a faint cloudiness but no definite precipitate. The capacity for fixing complement, however, was possessed by this serum to a very high degree. In other experiments they found that, if the antigen was greatly diluted, no precipitate was formed, but nevertheless the mixture was able to bind complement efficiently.

The case for the separate identity of precipitins and complement-binding antibodies rests on the following evidence. 1. Certain mixtures of antigen and antiserum in which a definite precipitate formed were shown to have little or no power to fix complement. 2. Mixtures containing very small quantities of either antigen or antiserum may appear perfectly clear and yet be shown to be very efficient for complement fixation. 3. Certain antisera give excellent results in complement-fixation experiments but yield very small precipitates. 4. If, during the process of immunisation, daily samples of serum are examined, complement fixation can as a rule be demonstrated at an earlier stage than precipitation. 5. If either the antiserum or the normal serum (antigen) be heated, the capacity for forming a precipitate may be lost, while the capacity for fixing complement may be retained. Bacterial extract kept for a time loses its power of forming a precipitate with homologous antiserum, but is still useful for the complement-fixation test. But, as will be seen from the following experiments, these difficulties can be explained without postulating the existence of two different kinds of antibody.

If a series of mixtures are prepared by adding various quantities of antigen to a constant quantity of a good antiserum, it is possible to compare the amount and state of division of the precipitate with the amount of complement fixed (Dean, 1911).

Scheme to illustrate the Diagrams used in the Tables.

No haemolysis	.....	□
Trace	.....	□
Slight	.....	□
Half haemolysed	.....	□
Marked haemolysis	.....	□
Almost complete haemolysis	.....	□
Complete	.....	□

TABLE IV.

Dilutions of normal goat serum (antigen).	1 in 10 dilution of rabbit <i>v.</i> goat serum (antibody)	1 in 10 dilution of rabbit <i>v.</i> goat serum (antibody).		
	(A)	(B) 0·05 c.c. guinea-pig comple- ment.	(C) 0·1 c.c. guinea-pig comple- ment.	(D) 0·2 c.c. guinea-pig comple- ment.
(1) 1 in 10	90 c.mm.	■	■	■
(2) 1 in 20	60 "	■	■	■
(3) 1 in 40	40 "	□	□	■
(4) 1 in 80	45 "	□	□	■
(5) 1 in 160	40 "	□	□	■
(6) 1 in 320	30 "	□	□	■
(7) 1 in 640	10 "	□	□	■
(8) 1 in 1280	5 "	□	□	■
(9) 1 in 2560	Large trace.	□	■	■
(10) 1 in 5120	Trace.	■	■	■
(11) 1 in 10240	Nil.	■	■	■

Column A represents the results of the precipitation experiment. The tubes 1 to 11 in column A contained a bulk of 10 c.c., made up of 5 c.c. of the diluted goat serum (antigen) and 5 c.c. of a 1 in 10 dilution of rabbit *v.* goat serum (antibody). The lower portion of each of these tubes was narrow and calibrated. The tubes were incubated for 4 hours at 37° C., and the progress of the precipitation was observed and recorded at regular intervals. Immediately after mixing turbidity appeared in tubes 2 and 3. At the expiration of 10 minutes flocculi were apparent in tubes 2 and 3 and tubes 1, 4, and 5 showed uniform turbidity. After half an hour large flocculi which had formed in tubes 2, 3, and 4, had fallen to the bottom of the tubes and left a clear supernatant fluid. Flocculi had formed in tube 1, but had separated less completely. Small particles were visible in tube 5 and just visible in tube 6. In tubes 7 and 8 turbidity was present without visible particles. After one hour the first 6 tubes showed a deposit and a clear supernatant fluid. Tube 7 showed small particles suspended uniformly throughout its contents. In tubes 8, 9, and 10 a progressively diminishing opalescence was seen. After four hours all the tubes were centrifugalised and the actual amount of the deposited precipitate was read. The figures are recorded in column A.

The columns B, C, and D record the results obtained in a parallel complement-fixation experiment. To obtain a quantitative estimate of the amount of complement fixed 3 doses of guinea-pig serum were employed for each of the 11 mixtures of antigen and antibody.

It is evident from a consideration of Table IV. that the proportions of antigen and antibody which produce the largest quantity of precipitate are not those which effect the greatest fixation of complement. Similar results were obtained by mixing a variety of antigens with the homologous antisera. When antigen and antibody are mixed in the proportions most favourable to precipitation the aggregation process takes place energetically and large flocculi are rapidly separated. But if the mixture contains a relatively smaller amount of antigen, precipitation is slower and less complete. These are the conditions favourable to

TABLE V.

	Precipitation Experiment.			Complement-Fixation Experiment.				Extract controls + 0.5 c.c. saline solution, 0.5 c.c. complement, 1 in 10.	
	+ 3 c.c. of fresh guinea-pig serum diluted 1 in 5.	+ 3 c.c. of saline solution.	+ 3 c.c. guinea-pig serum diluted 1 in 5.	+ 3 c.c. saline solution + 3 c.c. complement 2 in 5.	0.5 c.c. extract of <i>B. typhosus</i> diluted.	0.5 c.c. complement 2 in 5.	0.5 c.c. complement 1 in 5.	0.5 c.c. complement 1 in 10.	
(1) 1 in 10	Flocculent precipitate—turbid fluid.	Slight turbidity.	Clear.		(1) 1 in 10	□	□	□	
(2) 1 in 20	Large flocculent precipitate—clear fluid.	" "			(2) 1 in 20	□	□	□	
(3) 1 in 40	" "	" "			(3) 1 in 40	□	□	□	
(4) 1 in 80	Flocculent precipitate—clear fluid.	" "			(4) 1 in 80	■	□	□	
(5) 1 in 160	Small particles—clear fluid.	Opalescent.	"		(5) 1 in 160	■	□	□	
(6) 1 in 320	Opalescent.	Clear.	"		(6) 1 in 320	■	■	□	
(7) 1 in 640	? Trace opalescence.	" "			(7) 1 in 640	■	■	■	
(8) 3 c.c. saline solu- tion.	Clear.	" "			0.5 c.c. saline solution (serum control)	■	■	■	

**Precipitation.**—Result after 24 hours. The middle column shows the precipitation produced by mixing various quantities of typhoid extract with a constant quantity of anti-typhoid serum. The left-hand column shows the result obtained when fresh guinea-pig serum is added to these various mixtures of extract and serum. The third column shows that no precipitate is produced when normal guinea-pig serum is mixed with typhoid extract. Tube 8 in the left-hand column shows that no precipitate is produced by the mixture of the antityphoid serum with normal guinea-pig serum.

complement fixation. Under these conditions the individual particles which form the precipitate are extremely small, but present in the aggregate an enormously larger surface area than the flocculi of a coarser precipitate. It seems probable that there is a direct relationship between the surface area of the particles of the precipitate and the amount of complement fixed.

By taking any one antigen and any one antiserum and by varying the relative proportions of these two ingredients it is possible to prepare mixtures which demonstrate either precipitation without complement fixation or complement fixation without visible precipitation. The amount of complement fixed is conditioned by two factors: (1) The amount of precipitate formed and (2) the rate of precipitate formation. Complement is fixed during the very earliest stages of the aggregation process which forms the precipitate. Indeed, after the process has advanced to a visible turbidity very little complement is taken up. The relative proportions of antigen and antibody which favour rapid and complete precipitation are positively unfavourable to complement fixation. If a constant amount of antiserum be taken it will be found, as a rule, that the quantity of antigen which will produce the best complement fixation is many times less than the amount necessary to produce the largest precipitate. The reason why the two reactions do not run a parallel course is not that they are caused by two different sets of antibodies, precipitins and amboceptors, but because they represent two phases or two stages of the same reaction, and it may not be possible to demonstrate both stages under the same conditions. A flocculent precipitate represents the complete and final stage of a change which can be recognised in its earliest and incomplete stage by means of the complement-fixation method. On the other hand, if the mixture contains a very small amount of the antigen the aggregation process is extremely slow and may never proceed to the point at which even opalescence is produced. Such a condition is, however, very favourable to complement fixation.

The conditions which we have considered are those in which a relatively small amount of antigen is allowed to interact with a relatively large amount of antiserum. In these cases, although no visible precipitate is formed, the early stages of aggregation afford exactly the physical conditions which favour complement fixation. We must now consider the conditions which obtain in mixtures containing very small amounts of antiserum, and in complement-fixation tests a good antiserum can always be used in a dilution of 1 in 100, often 1 in 500, or even 1 in 1000. If, however, a cubic centimetre of a 1 in 500 dilution of antiserum be mixed with an equal quantity of a suitable

**Complement Fixation.**—This experiment shows the amount of complement fixed by mixtures of typhoid extract and antiserum identical with those used in the precipitation experiments. The dilutions of extracts, antiserum and fresh guinea-pig serum (complement) were all used in a bulk of 0.5 c.c. After one hour's incubation each tube received 0.5 c.c. of a 1 in 20 suspension of sheep corpuscles and 0.5 c.c. of a 1 in 300 dilution of haemolytic serum (rabbit v. sheep). The results were read after a second period of incubation lasting two hours.

dilution of the homologous antigen, not even a trace of a precipitate can as a rule be detected, for such a mixture contains far too little of the precipitable protein of the antiserum. What is the mechanism of complement fixation under these conditions? In a series of experiments (Dean, 1912) it was shown that if, to a mixture of antigen and antiserum which fixes complement, but produces little or no precipitate, there be added fresh guinea-pig serum, a very definite and flocculent precipitate is produced, although a comparatively long time (up to 24 hours) may elapse before precipitation is complete. An example of such an experiment is given in Table V.

Table VI.

In this experiment tubes were used, the lower portions of which were narrow and calibrated in order that the amount of precipitate formed could be measured. Only one quantity of antigen was employed (3 c.c. of a 1 in 20 dilution of typhoid extract) and one quantity of the antiserum (3 c.c. of a 1 in 20 dilution of antityphoid serum). The amount of precipitate formed by the simple mixture of the antigen and antibody is shown in the second column, Tube 8. The actual bulk of the precipitate was 10 c.mm.

TABLE VI.—To Illustrate Result obtained by adding Various Amounts of Fresh Guinea-pig Serum (Complement) to a Mixture of Typhoid Extract and Antityphoid Serum.

	3 c.c. of guinea-pig serum.	+ 3 c.c. antityphoid serum 1 in 20 + 3 c.c. typhoid extract 1 in 20.		+ 3 c.c. saline solution + 3 c.c. complement 1 in 20.	+ 3 c.c. typhoid serum + 3 c.c. antityphoid serum + 3 c.c. saline solution + 6 c.c. saline solution.	
		After 6 hours.	After 24 hrs. c.d.*			
1	Undiluted.	Large flocculi.	30 c.mm.	Clear.	Clear.	Clear.
2	Diluted. 1 in 2½	" "	30	"	"	"
3	1 in 5	" "	20	"	"	"
4	1 in 10	Small particles.	10	"	"	"
5	1 in 20	Turbid.	10	"	"	"
6	1 in 40	"	10	"	"	"
7	1 in 80	"	10	"	"	"
8	Control 3 c.c. s.s.†	"	10	"	"	"

\* c.d. = Centrifugalised deposit. † s.s. = Saline solution.

All the tubes were incubated for 6 hours at 37°C. The tubes were then placed in a cool room at 8°C. After 24 hours the tubes in the first column were centrifugalised and the deposits observed. All the control tubes remained absolutely clear.

The table shows that the addition of guinea-pig serum to this mixture caused a very marked increase in the bulk of the precipitate. In the tubes containing the large quantities of guinea-pig serum the bulk of the precipitate was twice and three times as great as the precipitate produced in the simple mixture of antigen and antibody. It is difficult to escape the conclusion that the larger precipitates were partly derived from the proteids of the guinea-pig serum.

Similar results were obtained in a large series of experiments in which various antigen-antibody systems were employed. Normal horse and normal sheep serum were shown to be as effective as guinea-pig serum in adding to the bulk of the precipitate. Similar results were obtained if in place of the whole guinea-pig serum a solution of guinea-pig euglobulin was employed. These experiments led to the conclusion that the interaction of antigen and antibody may cause the precipitation of the globulin of a normal serum if such is added to the mixture. That this precipitation of the globulin of normal guinea-pig serum is an essential part of the mechanism of complement fixation can hardly be doubted. It will be remembered that if euglobulin is precipitated from fresh guinea-pig serum by distilled water or weak acid, the complement is split in two fractions, the so-called mid-piece and the end-piece. The mid-piece fraction is carried down with the precipitated euglobulin while the end-piece remains in solution (Ferrata, 1907; Brand, 1907; Liefmann, 1909; Sachs and Altmann, 1909). Moreover, in complement-fixation experiments the mid-piece is bound to a much greater extent than the end-piece (Swirsky, 1910; Henderson Smith, 1910; Sachs and Bolkowska, 1910; Amako, 1910; and Gengou, 1911). It may, however, well be doubted if any such substance as the mid-piece fraction of the complement exists. The action of the so-called mid-piece may be entirely due to the physical state of the adsorbed particles of euglobulin.

It has already been mentioned that these precipitates, which occurred in mixtures of antigen, antibody, and complement, were often not formed until several hours had elapsed. The tubes were consequently often left overnight in the ice chest. This practice led to the observation that these precipitates are formed most readily at a low temperature and that, if after the precipitate has formed, the tubes are placed in an incubator at 37° C. the precipitate dissolves and the mixture becomes once more absolutely clear. On replacing the tubes in the ice chest the precipitate re-forms. The behaviour of this precipitate which forms at 0° C. and dissolves at 37° C. strengthens the belief that we are dealing with an adsorption process. At the lower temperature the adsorption of euglobulin by the minute particles of the precipitate is more complete. When the antigen is a cell or bacterium susceptible to lysis the result of this aggregation of the particles of euglobulin is the concentration of the lytic agent present in the complement (so-called end-piece) at the surface of the cell which is to be dissolved. For the subsequent and distinct reaction which causes the solution of the cell envelope a relatively high temperature (37° C.) is necessary or, at any rate, desirable. If the fixation of complement is dependent on an adsorption process we should expect that the reaction would take place with greater facility at a low rather than a high temperature.

TABLE VII.  
+ 0·5 c.c. antityphoid serum  
diluted 1 in 100.

0·5 c.c. extract of <i>B. typhosus</i> diluted.	+ 0·5 c.c. antityphoid serum diluted 1 in 100.		+ 0·5 c.c. saline.	
	Complement 2 in 5.	Complement 1 in 5.	Complement 1 in 10.	Complement 1 in 10.
	0° C. 37° C.	0° C. 37° C.	0° C. 37° C.	0° C. 37° C.
(1) 1 in 5	■ ■	□ □	□ □	■ ■
(2) 1 in 10	■ ■	□ □	□ □	■ ■
(3) 1 in 20	■ ■	□ □	□ □	■ ■
(4) 1 in 40	■ ■	□ □	□ □	■ ■
(5) 1 in 80	■ ■	□ □	□ □	■ ■
(6) 1 in 160	■ ■	□ □	□ □	■ ■
(7) 1 in 320	■ ■	□ □	□ □	■ ■
(8) 0·5 c.c. saline.		■ ■	■ ■	

In the experiment reproduced in Table VII, duplicate sets of the bacterial extract, the antiserum, and the complement

were prepared. Set A was warmed to 37° C. and Set B was cooled to 0° C. Antigen, antibody, and complement were then mixed in the proportions indicated in the table. Set A was then kept for half an hour at 37° C. and Set B for half an hour at 0° C. Both sets were then exposed to room temperature for one hour. Blood and haemolytic serum were then added to each tube and all tubes were then incubated for two hours at 37° C. The results show a very marked difference between the two sets.

This experiment shows that in a mixture of typhoid extract and antityphoid serum far more complement is fixed at 0° C. than at 37° C. Similar results have been obtained with serum and homologous antiserum and with the Wassermann reaction.

Moreover, if an experiment be devised to show the rate at which the reaction occurs at the two temperatures it is possible to demonstrate that, although the reaction takes place more rapidly at 37° C., the actual amount of complement fixed is much greater at 0° C. This result is best explained on the assumption that complement fixation is a process of adsorption.

#### AGGLUTINATION.

The explanation of the agglutination reaction as an adsorption phenomenon has been the thesis of many contributions to the literature of immunity. Bordet (1899) considered that agglutinin is adsorbed by the bacilli as dye is adsorbed by filter paper. The aggregation of the bacilli is then brought about by changes in the molecular attraction between the bacilli and the surrounding medium. The question of agglutination was very thoroughly studied from the adsorption standpoint by Craw (1905). Craw showed that the rate of addition of bacillary suspensions to agglutinating serum is a factor determining the amount of agglutinin fixed by the bacilli. By adding a suspension of bacteria in parts to the antiserum Craw was able to show that more agglutinin was removed than is the case when the whole amount of bacillary suspension is added at once.

The process of agglutination is probably brought about by an interaction between the antiserum and antigen which has passed out from the bacillus into the medium which immediately surrounds it. The result of this interaction is the aggregation of the particles of the globulin of the antiserum on the surface of the bacillus. In other words, the proteins of the antiserum are adsorbed by the bacillus. For the production of agglutination the presence of precipitable protein is essential. If to a mixture of bacillary emulsion and diluted antiserum there be added a third ingredient, normal serum, the agglutination of the bacteria is rendered more complete. This reinforcement of the proteins of the antiserum by those of a normal serum has been called conglutination. This phenomenon was described independently in 1906 by Muir and Browning and by Bordet and Gay.

The substance present in normal serum which is able to aid the agglutination of red cells or bacteria by the homologous antiserum appears to be the euglobulin (Dean, 1911). The effect of adding various dilutions of euglobulin solution to mixtures containing sheep cells and various quantities of the homologous antiserum is seen in Table VIII.

TABLE VIII.

1 c.c. of dilution of haemolytic serum, rabbit v. sheep.	+ 1 c.c. middle-piece solution diluted.				+ 1 c.c. normal saline.
	1-10	1-20	1-40	1-80	
1	+++	++++	++++	++++	+++
2	+++	++++	++++	++++	+++
3	+++	++++	++++	++++	+++
4	+++	++++	++++	+++	++
5	+++	+++	+++	+	+
6	+++	+++	+	0	0
7	+++	+	0	0	0
8	+++	+	0	0	0
9	1 c.c. normal saline.	0	0	0	0

Each tube contained a volume of 3 c.c. made up of 1 c.c. of a 1 in 20 suspension of washed red cells of the sheep, 1 c.c. of a dilution of heated haemolytic serum (rabbit v. sheep), and 1 c.c. of the diluted middle-piece solution. The tubes numbered 9, in each row, contained no immune serum and the bulk was made up to 3 c.c. by the addition of 1 c.c. of normal saline solution. In these tubes no agglutination occurred, the middle-piece solution by itself being unable to agglutinate the red cells. The tubes in the last column contained 1 c.c. of the suspension of red cells, 1 c.c. of a

d lution of the haemolytic serum, and 1 c.c. of normal saline solution. The agglutinative power of the immune body acting by itself is shown in this column. In the remaining columns is shown the effect of the combined action of the immune body and the middle-piece solution.

That in such a reaction the euglobulin is actually precipitated may be shown by an experiment similar to that shown in Table IX.

TABLE IX.

Tube	Solution of laked corpuscles	Antiserum, rabbit v. sheep cells, 1 in 200.	Normal saline solution.	Solution of middle-piece 1 in 10.	Normal saline solution.
1	c.c.	c.c.	c.c.	c.c.	c.c.
2	5	5	—	10	—
3	5	5	5	10	—
4	—	5	5	10	10

One cubic centimetre of thoroughly washed sheep corpuscles was laked with 9 c.c. of distilled water. The solution of corpuscles was made up to the usual saline content by the addition of 10 c.c. of 1·7 per cent. sodium chloride solution. After filtering many times through filter paper a perfectly clear solution was obtained, representing a 1 in 20 solution of red corpuscles in normal saline. The following mixtures were then prepared:

In tube 1, 5 c.c. of the solution of corpuscles was added to 5 c.c. of the diluted antiserum. In the control tubes 2, 3, and 4 the ingredients indicated in the first three columns were mixed. The volume in each tube was then 10 c.c. All the tubes were allowed to remain for one hour at room temperature. They were then examined, and the contents were found to be absolutely clear. To tubes 1, 2, and 4 were then added 10 c.c. of the 1 in 10 middle-piece solution; to tube 3 was added 10 c.c. of normal saline solution. All four tubes were then incubated for four hours at 37° C. and then placed for 12 hours in a cool chamber at about 8° C. Tube 1 was then found to contain a small but definite white flocculent deposit. The three control tubes remained absolutely clear.

#### CONCLUSIONS.

In discussing the merits of rival theories of the mechanism of the serum reactions it has been frequently observed that Ehrlich's hypothesis alone provides an explanation of the problem of specificity. The value of the side-chain theory as an explanation of specificity may, however, be doubted. To say that antigen unites with antibody as a key fits a lock is no explanation at all. It is merely a diagrammatic representation of the supposed facts. Of the nature of the fundamental reaction between antigen and antibody we have, at the present time, no knowledge. But, in all the serum reactions which have been above considered, the immediate consequence is an aggregation of globulin particles around the antigen. The degree to which the aggregation or precipitation proceeds depends entirely on the experimental conditions, on the relative proportions of antigen and antibody in the mixture, on the nature of the antigen-containing substance, red corpuscle, bacillus, or normal serum, on the presence of some third factor, a normal serum containing complement or conglutinin. In other words, the various serum reactions are various methods of observing and measuring one single reaction. The simplest of these reactions is the precipitation reaction, for in it the formation of the precipitate is directly observed. In the other reactions the aggregation of particles may be less complete and the change is measured by indirect methods.

The main phenomena are most readily accounted for by Bordet's adsorption theory, and no useful purpose would seem to be served by postulating the existence of a separate kind of antibody for each of these reactions. The reactions are no doubt of a very complex nature, as all reactions which occur in a mixture of colloids must be, and it is to be anticipated that great difficulties must be encountered before any entirely satisfactory explanation is arrived at. Similar difficulties have been met with in the past, whenever the attempt has been made to explain physiological phenomena in the light of the laws of chemistry and physics. These difficulties will in time be met and with a more perfect knowledge of the mechanism of the serum reactions there will be attained a more perfect knowledge of the laws which govern both natural and acquired immunity.

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Continued at foot of next column.

## Presidential Address

ON

### THE STATE OCTOPUS AND THE MEDICAL PROFESSION.

Delivered at the Harveian Society of London on Jan. 11th, 1917,

By EDMUND CAUTLEY, M.D. CAMB.,  
F.R.C.P. LOND.,

SENIOR PHYSICIAN AT THE METROPOLITAN HOSPITAL AND THE BELGRAVE HOSPITAL FOR CHILDREN.

GENTLEMEN.—Year by year the State, like an octopus stretching out one or more of its tentacles, grasps and absorbs some portion of the rights, privileges, or emoluments of the medical profession or the public. I propose to indicate roughly, for time will not permit me to do so in great detail, the methods and progress of this absorption. I shall appreciate its value to the public, even if it is detrimental to our profession as a whole or to individual sections of it, for I hold the opinion that the public welfare is our highest aim and object. And I shall try to gauge its progress and suggest the best methods for watching and directing its course.

#### CHANGED RELATIONSHIP OF THE STATE, THE PUBLIC, AND THE MEDICAL PROFESSION.

Half a century ago there was little State interference with the medical profession, and few burdens, except registration, were laid upon it. At this remote period it was customary for the eminent lecturer who gave an opening address at a medical school to speak in grandiloquent language of the noble aims of our profession. It was generally insisted that the student must not enter on its pursuit for the sake of filthy lucre, that the good of the public was alone of importance, and that life should be lived on a basis of pure altruism, even if it did not provide substantial meals. Verily an opening address was a true eye-opener. The lecturer was usually a successful man who did not realise the needs of the common herd or had forgotten earlier impecunious days, though occasionally one was bold enough to recall the principle that the labourer is worthy of his hire, or else he spoke with his tongue in his cheek.

Even in those days the State exploited the services of the profession, for the medical attendant was compelled to give a death certificate without fee. And if he happened to be an officer of a public institution and an inquest were held on a patient who died therein, he had to give expert evidence when called on; he had to make a skilled post-mortem examination should the coroner order one; and he had to waste valuable time in the precincts of the court; and all this without fee or reward, receiving thanks rarely and ungracious criticism not infrequently. No wonder it is

Continued from preceding column.

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Welsh and Chapman (1907): Proc. Roy. Soc., B., lxxxviii., 297.

more satisfactory, as this exploitation of our youngest members still exists, that the patient should die on the steps of the hospital rather than across the threshold.

Under the Public Health Act of 1875 urban and rural sanitary districts were formed. Medical officers of health were appointed in charge of these districts. A diploma in public health was evolved in order to specialise this branch of service and supply evidence of the examinational qualifications of those applying for such posts. Since then the medical officer of health, though often underpaid, has developed into a being of imposing power and authority, under the *egis* of the Local Government Board. In a sense he is the lily of the profession, for he toils not neither does he spin in the practice of medicine, unless he is in charge of an isolation hospital. He is no longer a medical man; he has sloughed his skin and unfortunately has become a departmental official, to whom the interests of the profession are only of minor importance.

Many of the burdens thrust upon our patient shoulders have arisen through the uncontrolled activities of these officers or at their instigation. Thus, we have to notify cases of infectious disease. Year by year more and more diseases are included in this category; perhaps at first only in some urban district and on the *ipse dixit* of a medical officer of health, who speaks to his local council with the dogmatic voice of a god, for he alone is assumed to have knowledge of the subject. For instance, notification of whooping-cough is insisted on in some districts in spite of the fact that there is no evidence of its value in reducing the spread of the disease, and that, generally speaking, it is not diagnosed among the poorer classes until the whoop is characteristic and the infectious stage almost over. Poliomyelitis has also been added to the list, although there is no evidence of its conveyance by direct infection. And in 1913-14 ophthalmia neonatorum was wisely added. Of course the main object of notification is to control the spread of the disease and isolate its source. It sometimes is beneficial in leading to efficient treatment. But I maintain that no disease should be made notifiable unless such a measure is approved by an authoritative body representative of our profession.

In 1907 the medical inspection of school children was authorised by Parliament and medical officers were appointed for this purpose. It was not a great step onward to the treatment of enlarged tonsils and adenoids and errors of refraction. This is partly carried out in hospitals and partly by general practitioners in semi-private clinics. Seeing that severe haemorrhage is possible after operation, such clinics ought to be provided with an emergency bed. Possibly a further step will be the treatment of all ailments in school children at these clinics and the gradual evolution of numerous small centres of semi-hospital practice, which may or may not be to the advantage of the public and the profession. Bear in mind that the school doctor does not treat these patients at present. He measures and he weighs them, collecting masses of statistics. He examines them and recommends treatment. He, too, has become a departmental officer.

The Public Health (Tuberculosis) Regulations of 1912 have transferred the treatment of tuberculous patients in great measure to public officials with medical qualifications. These patients now come under the conjoint charge of the medical officer of health, the medical officer of the tuberculosis dispensary, and perhaps a sanatorium medical officer. It is possible that all cases, rich and poor, will eventually be brought under such control and that the treatment of patients with tuberculosis, especially of the lungs, will pass out of the hands of the general practitioners into those of departmental officers.

The Mental Deficiency Act of 1913, in operation since April 1st, 1914, has also affected our relations with the public and the State.

The National Insurance Act brings home to us the profound changes which are taking place in the relationship between the medical profession and the public, through the medium of the State and its various subordinate bodies, such as county and borough councils, municipal bodies, and boards of guardians.

#### "MENTALITIES."

Let me digress for a moment and, after the style of a virulent medical controversialist, make a few preliminary remarks on what are at present called "mentalities." Let me premise that "change" is not synonymous with "progress," though to some minds all change is progress.

In actual life we meet with two distinct types of mentality, though the bulk of mankind occupy an intermediate position. One man goes baldheaded for change. He is an iconoclast. He destroys an existing institution because he sees evil in it, but he lacks the intelligence or the patience to think out logically the alternative scheme in his mind and the evils likely to develop in his new Utopia. The Insurance Act and other political measures are priceless illustrations of this character.

In golden visions a new land legislation was going to hand over that Castle in Spain, the latent wealth in our agricultural industry, to those unfortunate men, the failures in the towns. They were to go "back to the land" and earn vast sums from the cultivation of the ground in spite of their lack of training and education in one of the most difficult of trades, one which can only be learnt thoroughly by an intimate experience from childhood of all the processes of agriculture.

So, too, vast sums were to be drained into the Treasury by means of an increment duty. The result, as foretold by the opponents of this measure, has been a great pecuniary loss to the Treasury and a disadvantage to the poor, by reducing the provision of cottages and inducing a rise in rents. Rather than attempt to raise money and at the same time put a drag on the building industry, it would have been wiser and cheaper to spend five millions a year, one day's war expenditure, on the building of cottages and other dwellings for the wage-earning classes.

Usually the man of this type regards the medical profession as a "monopoly"—that blessed word which damns without explanation of its meaning. He little knows that the monopoly consists in the payment of fees to the State, for various degrees and a licence to practise, in return for an amount of protection which may be summed up in the power to sue for fees for services rendered. Neither the public nor the profession is protected against the evils of quacks and quack medicines. Anyone may practise our art in all its branches so long as he does not pretend he is a qualified medical practitioner, though he is liable to prosecution for manslaughter if his patient dies. And under the Apothecaries Act of 1815, Section xx., he is liable to a penalty (fine) if he practises as an apothecary. Of so little value is this State protection that probably any one of you would make a larger income out of our woolly-headed public by dropping your titles and diplomas and advertising a sure remedy for all the ailments of mankind. I would suggest a pill which acts mildly and efficiently, purging the vile body of all its ill humours and the afflatus which is not divine.

The other type of man is less adventurous in the doing of good or evil by interference with the ordinary routine of life. He does not set the world ablaze to advertise his own importance. He is devoid of the vanity which lies at the root of the desire to put the world to rights. He is more or less satisfied that all is for the best in the best of all possible worlds, and that it is better to endure the ills he knows than to stir up others which may be worse. Such a man becomes stereotyped in thought and action, in speech more dogmatic as his arteries harden, and somewhat intolerant of new ideas, even if of German origin. Steadily and satisfactorily he conducts the routine business of the little world in which he lives. Slowly and cautiously he tests, and perhaps adopts, new hypotheses and fresh methods of treatment. In the face of fresh ideas it is his habit to "wait and see." Yet, withal, he is tardily progressive, not wildly careering after the exploitation of some new system of treatment or synthetic drug, but patiently sifting and adding to the sum of knowledge.

Roughly, the difference between these two characteristic mentalities is like that between youth and age. Fortunately most of us occupy an intermediate position, neither wildly iconoclastic nor too rigidly stereotyped. Few seem to get beyond middle age in the realms of mind, until the final rapid subsidence into complete senility or retirement into the country and a vegetable existence. It is medical men of this intermediate type who are so badly needed on State and municipal committees. Were such an influence more in action we should not so frequently be up against some new thing, experimental in character rather than of proved value.

#### NEW SCHEMES.

I have already pointed out that many a scheme is evolved by the Local Government Board, or a subsidiary council, without obtaining the consultative opinion of any representative medical body, and often on the mere *ipse dixit* of

some local medical officer of health. Sometimes it is initiated by a self-appointed leader of the profession, who collects others like unto himself. We have had instances of this in the development of the crusade against tuberculosis. Occasionally these "leaders" are in opposition, as in the painful case of the manifesto published in favour of alcohol. But, however initiated, the scheme is set in action by an Order in Council or some local by-law, and we are expected to carry it out without murmur or protest.

As a rule these fresh burdens on the doctor are unaccompanied by fees for the extra work, or at most only nominal ones. For instance, the fee for notification of infectious disease used to be 2s. 6d. for a private and 1s. for a hospital case. It is not obvious why the extra work should be paid for at a lower rate when it is done by an underpaid doctor attached to a public institution. The profession has recently received its just reward for submitting to such an inequality in payment for identical work. Its insignificant fee of half-a-crown has been reduced to a shilling for private cases. I wonder that the shilling fee for hospital cases has not been halved. And this reduction has been enforced at a time when the doctors are doing an enormous amount of gratuitous work and the cost of living has greatly increased; and it was carried by Members of Parliament receiving £400 a year, of which £100 is free of income-tax, at a time when the services of most of them are of little value and their work in the House of Commons has much decreased.

#### THE INSURANCE ACT.

The Insurance Act is a great conception inadequately carried out. Instead of being used as a vote-catching measure, and including all employees, no matter their age and health, it should have been started on a smaller scale for the public benefit alone. It ought to have been limited at first to employees under 25 years of age, the healthiest class in the community. In the course of 40 years all the wage-earning classes up to the age of 65 years would have been insured. No doubt 40 years is too long for the politician, though but a moment in the life of a nation. I believe that the soundest policy would be to start a new scheme on these lines, independent of the present one, which would eventually lapse and be replaced by an efficient Act. In its present state the financial basis of the Act is less than doubtfully sound, its administration chaotic, its innumerable regulations almost impossible to understand, and the general result one of dissatisfaction. Practically it has resulted in a huge club system on a State basis, possessing all the evils of the old club system and none of its advantages to the members from a medical point of view, but financially profitable to the doctors and the clerical staff. As far as I can judge, the only advantage to the public is that every insured patient is entitled to demand treatment for the most trivial ailment, and a certificate enabling him to obtain sick benefit if unable to work, with the result that trivial ailments have become much more frequent and a desire of obtaining a paid holiday has led to their exaggeration.

From the public point of view I regard the medical section of the Act as a failure. It is not as good as the old club system with its admitted evils. Thousands of the insured are dissatisfied and avoid their panel doctors. Adequate treatment has not been secured—merely ordinary out-patient treatment, the patient being referred to a hospital for more serious ailments.

The Government has not carried out Mr. Lloyd George's promises. Absolute freedom as to choice of doctor is not in force; he must be on the panel. Still less is it possible to make a change when desired. Permission to make "own arrangements" outside the panel have been generally refused.

Panel doctors are practically State officials and their sympathy with the patients has diminished. There is more illness, more malingering and neurasthenia, greater prolongation of illness, and an increasing demand for certificates. Often a patient obtains a larger income when ill than when at work. Disease has to be treated more or less according to rules, and the cheaper drugs used for panel patients help to prolong illness.

Some complaints from panel patients are trivial and contemptible. The members of a society for agricultural labourers complain bitterly that the doctor now charges 5s. for examination of an applicant for membership, whereas in the old club the fee was only 2s. They refuse to pay it and

the society is languishing for want of new members. It does not appear to have been pointed out to them that the weekly wage of the labourer has gone up more than 5s., that the doctor has also to face the increased cost of living, and that in the old club the doctor took a much more sympathetic interest, regarding it as partly a charity, whereas insurance is a State affair.

And I want to lay it down as an axiom, to be borne in mind by every member of our profession, that gratuitous expert services should not be rendered to the State or any rate-levying body. No such service is appreciated at its true value. It is not charitable service to the poor, and merely lightens to an infinitesimal extent the burden on tax- and rate-payers, many of whom are much better off than the exploited doctor.

#### Payments under the Act.

Under ordinary systems of insurance it is customary to pay a premium in advance to cover a definite liability, generally for a year. The Insurance Act tempers the wind to the shorn lamb, for the insured patient has to pay weekly premiums for six months before becoming entitled to benefit. By this means a big fund was formed of contributions from the employers, employees, and the State. It should have amounted to 13s. per female and 15s. 2d. per male, apart from the State contribution. At the end of six months the work of the doctor began, and there does not seem any just reason why he should not have been paid 7s. per head at once for each patient accepted by him. Apparently the accumulated preliminary fund was devoted to payment for clerical work, a great burden on the finance of the Act—a veritable old man of the sea.

The Act fixed an annual capitation grant for medical treatment, and Mr. Lloyd George frequently stated it would be at least 7s., possibly more, as there was a lien on a floating sixpence. But agreements between the State and the profession are apparently only to be kept by the latter. In step the Insurance Commissioners, with powers above and not under the control of Parliament, and, subsequent to the signature of these agreements, regulations are issued which make the annual capitation fee a sum of no definite amount and not payable within certain limits of time. The panel doctor receives an unnamed sum, paid on uncertain dates, and "as soon as may be" after its receipt by the Commissioners.

The medical profession undertook the treatment of the insured for a minimum fee of 7s. per annum. For 1915 the payment was 5/7-96 per head. This is explained by the Commissioners as an equivalent payment, because some of the doctors' lists are inflated. It is a method for counteracting the errors due to inefficient book-keeping. It creates great injustice. A doctor with an uninflated list receives a grant deficient to the extent of 20 per cent. The Commissioners have also determined that their liability to the panel doctor ceases with the death of the patient, although the doctor undertook the contract for a year. If the insured person dies on the first day of the year the medical fund is only to get 1/365th part of 7s.; and this, in spite of the fact that the Commissioners have received payment for six months in advance. It does not appear that the State is carrying out its bargain fairly.

#### New Regulations for 1917.

Clause 3 deals with the provision of medical services by any public authority over and above those provided by panel doctors. It states, with dangerous vagueness, that under such circumstances the practitioner "shall ..... take such other steps as may be reasonably necessary in order that the patient may derive full advantage from the provision of such services." Obviously the Commissioners will decide what is "reasonable," and, as far as one can judge, they expect the doctor to provide particulars as to the past history, diagnosis, and treatment; take and send specimens for laboratory examination; and attend, if necessary, with the patient for consultation. No extra payment is suggested for this fresh burden, which may become excessive. And there is no safeguard against the extension of so-called "reasonable provisions." This regulation gives the Commissioners power to increase the duties of the panel doctors without compensation. It has been accepted at present for the treatment of venereal diseases, which are said to have increased very greatly and require more adequate methods of control. But it may be applied in many ways, if consultative advice is to be placed within the reach of panel patients,

giving the doctor much extra work and with no extra expense to the patient. Instead of reducing the annual capitation grant the tendency will be to increase the doctor's duties and obligations.

#### *The Disabled Soldier and Sailor.*

The disabled soldier and sailor have created another problem for the doctors and Commissioners. Weak-minded sentimentalists nobly say that the medical profession should shoulder the burden of looking after these heroes. But it is the State which should bear the burden, not an individual section of the community. Had the Government, with a little foresight and apparent generosity, paid into the insurance funds the full amounts due from them as employers, the full contributions of their employees, and the State grant, they might have been justified in saying that, as the medical profession had received the insurance premiums for medical services during the war, they must undertake the subsequent liability. But an extra burden has fallen on the panel doctors during the war, for a huge number of healthy lives have been removed from insurance, and the relative proportion of illness among the remainder is naturally greater. It would be grossly unfair for these men to come back into insurance with an increased sickness liability and the burden of their treatment be thrown on the panel doctors without extra payment. Special financial arrangements should be made for the treatment of the disabled when they are discharged.

#### *VENEREAL DISEASES.*

The provision of treatment for these affections under the public authorities is a great step to more efficient control, limitation of their extension, and efficacious treatment. But it is another inroad into the old relationship between the public and the profession, if it is made obligatory. So far it is not compulsory and the supporters of the scheme have not ventured to "go the whole hog." If so, notification would be essential. The main argument against it is that it would lead to concealment of disease, to evasion of treatment, or to treatment by quacks. Surely the answer is the abolition of quacks and quack medicines, and the punishment by imprisonment of anyone, except a qualified practitioner, who undertakes the treatment.

Compulsory notification has been adopted for many infectious diseases, as well as for others in which the transmission of infection by personal contact has not yet been adequately proved. Why, then, shirk it in this case? Is it because the Government fear the loss of revenue from stamp duties on patent medicines, or the attacks of newspapers which receive large sums of money for advertisements and puffs of these wares? More probably it lies in the absence of social stigma in the present notifiable diseases. On the other hand, the moral effect of notification on the rising generation would be enormous. Few young men dread infection as much as they fear being "found out" by their parents. And the risk of evasion is minimised by the provision of free treatment, for, under the new scheme, it is available for rich and poor and under safeguards as to privacy. But the whole scheme is defective, firstly, because no really authoritative medical body expressed its opinion thereon; secondly, because it establishes a new class of specialist; and thirdly, because the safeguards as to privacy are likely to prove illusory.

#### *THE OUTLOOK.*

The united efforts of panel practice, of State and municipal treatment of tuberculosis, venereal and infectious diseases, the possible provision of ante-natal and post-natal clinics, and the existence of numerous departmental medical hybrids in the shape of medical officers of health, school doctors, Poor-law and asylum doctors, tend to the establishment of a State medical service. An additional influence will be the return from the war of a large number of medical men, with no experience of civil practice, who may lack the means or the inclination to enter on such a mode of livelihood, and who may have become enamoured of an annual stipend, fixed duties, liberal freedom, and the independence of character acquired in the treatment of those submitted to their tender care and unable to change their doctor. Many will be disposed to sink to the level of the salaried official. Meetings have already been held in France, at the instigation of certain politicians, for the discussion of such a public service.

It is probable that in time each panel doctor will be limited to a definite number of panel patients—say, two to three thousand. From this it will be only a small step, and perhaps it may be advocated by the doctor, that panel practice should be limited in area and that each such doctor shall have charge of all the insured patients in a limited district. Of course, this would abolish the promised free choice of doctor, but I fancy this privilege is not often obtained or of much value. The natural sequence will be the conversion of panel practice into one of whole-time appointments. And the insurance of dependents will make this more certain, as finance on present lines will be impossible. It is obvious also that if clinics and pathological laboratories are provided for venereal diseases, a similar demand will be made for panel patients with other ailments. And, indeed, it seems logical that, if the insurance scheme is to be worked adequately on its medical side, it must be extended to the provision of hospital treatment with all the advantages pertaining thereto. Our hospitals will have to be assisted by the State or out of the rates, or taken over by the State. I am strongly opposed to the idea of a State medical service, but I see no great objection to hospitals receiving such assistance. It may necessitate a certain amount of supervision or control, possibly through the occasional visit of an inspector or by a representative on the committee of management. The amount of assistance would have to be proportionate to the work done and the facilities provided. There is no justification for hospitals putting their resources, provided as a charity by voluntary subscribers, gratuitously at the disposal of a State or rate-paid medical service.

Naturally there would be a big increase in hospital expenditure. The visiting staff of London hospitals receives no payment, or merely a nominal one, and is perfectly satisfied to give its expert aid and much time in a charitable cause. But, although it is often assumed that we will continue to give gratuitous services in return for a few gracious words of praise and an occasional title of honour, more often than not granted to some one or other of the less deserving of the profession, I think it will soon be realised that it is not charity to give such services to the State.

Recently there has been a striking illustration of the manner in which the medical profession is exploited. Although the State is responsible for the health of its officers as well as the rank and file, and reserves to its representatives the decision as to the capacity and fitness of the individual, it has accepted through the Red Cross Society and rich civilians the gratuitous services of a large number of our profession for the treatment of these officers. And I desire to remark that the treatment of officers on these lines in private houses, more or less suitable, is not, and cannot be, as good as that of the rank and file in the numerous large and well-appointed hospitals at their disposal, with the best conveniences for examination and treatment. The lack of a resident medical officer, a pathological apparatus and X ray apparatus, not to mention other defects, is a grave drawback. It is marvellous that there has been no outcry against a system so unfair to our officers.

I think it will be admitted that when valuable aids to the diagnosis and treatment of illness of all descriptions are at the disposal of the present panel patients they will be extended for the benefit of their dependents. All those receiving a weekly wage, and (or) below the income-tax limit, will be included. Do you think that the lower middle-class will be content to see the bulk of the nation provided with the best possible medical treatment, for which *they* are mulcted in high rates and taxes, without demanding similar provision, on a better scale as to environment, at a higher annual insurance fee? Treatment in a private ward in a properly equipped hospital is obviously much superior to that of any nursing home or private house. Hospitals will have to be enlarged to provide special wards for this class. The nation will be divided into the insured and the non-insured. Possibly the large group of the insured will be treated by State official doctors and the remainder will still exert the right of free choice of doctor and payment for services rendered. The State official will be a superior type of Poor-law doctor.

A State medical service will not be economical, though perhaps less extravagant than the panel system. It is suitable for those under discipline, but we do not want the nation under the heel of medical drill-sergeants. No doubt

there has been immense improvement in the control and prevention of disease by the medical department of the Local Government Board. And a certain amount of valuable work has been carried out in laboratories in reference to the cause of particular diseases. School medical officers have done good work in securing efficient treatment for hundreds of children who would otherwise have been neglected. But, so far, I have not noticed much evidence of any advance in scientific medicine, though the extension of treatment has been great and beneficial. Nor have I observed much original work done by the present State medical service—namely, the Poor-law doctors.

Further encroachment on private practice will ensue from the extension of sanatorium benefit to dependents. Wild-cat schemes have been mooted. Recently it has been suggested that, as sanatorium treatment has not produced any marked effect on the prevalence of tuberculosis, it would be better to insist on the wholesale migration of the tuberculous from unhealthy surroundings to properly supervised dwellings in pure air. It certainly would be a wholesale migration. And yet many develop tuberculosis under such conditions, while others sometimes recover though living in a most unfavourable environment.

#### SUGGESTIONS.

I hope I have made it clear that our relations with the State and the public are in a state of flux, and that it is dependent on individual members of the profession to watch and direct the course of the current. Unfortunately we have no representative body which possesses the complete confidence of our profession or the power to enforce its resolutions. The British Medical Association diminished its rapidly increasing influence by allowing some members of its council to make use of it for political purposes in connexion with the Insurance Act. At first it was remarkably successful in organising the profession in opposition to the Bill on certain lines, but some of its members broke up the concordance by holding meetings in support of the Bill. Incidentally I may remark they remained members of the Association.

Still, it is possible for the British Medical Association, if managed with greater tact, more tolerantly, and for the benefit of the profession as a whole, rather than for the advancement or advertisement of sections or individuals, to obtain and retain a valuable advisory and directing hand in the future. As our only active representative body it should receive our support, even if we do not invariably agree with its policy in particular cases.

I am strongly of the opinion that it is of the utmost importance for medical men to take a greater part in local politics and act as representatives on county councils and other local bodies. The selection of candidates for such posts should be made by the various branches of the British Medical Association, or at a joint meeting of members and non-members. But it must be borne in mind that such candidates must have no political axe to grind, and that the welfare of the public and the profession is their sole object. We do not want a repetition of the scandals in connexion with the appointments at the time the Insurance Act was in the throes of labour. Nor do we want representatives who have retired from practice through age, incompetence, or infirmity, for such posts are not those of *otium cum dignitate*. Granting efficacious leadership, it will be possible to develop a medical service, suitable to the genius of the nation, out of the present state of chaos which I have somewhat inadequately pictured. Above all, under proper leadership, it will be possible to put forward practical schemes, carefully thought out under medical guidance, rather than have to carry out the imperfectly devised experiments to which we and the public are subjected.

**THE LATE W. A. LAUDER SMITH, M.A., M.B., B.C. CANTAB.**—Dr. Lauder Smith died recently at his residence, Wells, Somerset, from pneumonia following influenza, in his fifty-second year. The deceased was highly esteemed in Wells, where he had several public appointments. The chairman of the Wells board of guardians, in alluding to the loss the board had sustained by the death of their district medical officer, said: "Dr. Smith had lived a beautiful life of self-sacrifice, and had literally worn himself out for others."

#### CASES OF CEREBRO-SPINAL FEVER IN THE ROYAL NAVY—AUGUST 1ST, 1915, TO JULY 31ST, 1916.

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##### (1) Incidence of the Cases.

DURING the year August 1st, 1915, to July 31st, 1916, there were 104 cases of cerebro-spinal fever in the Royal Navy, as compared with 170 cases during the first year of the war. This fall in the number of cases must be correlated with the contemporaneous fall in the incidence of the disease both in the civil population and also in the Army in this country.<sup>1</sup> Although the fall in the general incidence of the disease is probably the main factor in the smaller incidence in the Navy, it should be borne in mind that great care has been taken in prophylaxis, and that in the first half of 1916 bacteriological examination of swabs from the throats of new entries was made at Haslar, Chatham, Plymouth, and at Greenwich of non-contacts (new entries and drafts for sea) in order to detect "carriers." Out of 10,852 ratings examined 298, or 2·7 per cent., carriers were thus detected and isolated. Not only has the incidence been smaller, but it has been less widespread, for no case occurred at Blandford Camp or in the Akbar Establishment, in both of which there were a few cases during the first year of the war. At the Deal dépôt, which was responsible for 25 cases during the first year of the war, there were 2 cases only in the second year. No case has occurred during the war at either Osborne or Dartmouth Royal Naval Colleges.

The cases occurred in the Plymouth district (28), Portsmouth district (27), Chatham district (18), at Shotley (11), at the Crystal Palace dépôt (8), at Deal (2), and 10 cases on sea-going ships. During the first two years of the war out of 274 cases of cerebro-spinal fever in the Navy there were 22, or 8 per cent., with 13 deaths in sea-going ships. In one ship only was there more than one case (2).

The monthly incidence, with the results, is shown below. As in the first year of the war, the largest number of cases and of deaths occurred in February.

	Cases.	Deaths.	Recoveries.
1915.			
August ...	4	2 or 50·0 p.c.	2
September ...	4	3 .. 75·0 ..	1
October ...	3	1 .. 33·3 ..	2
November ...	6	5 .. 83·0 ..	1
December ...	8	4 .. 50·0 ..	4
1916.			
January ...	8	3 .. 37·5 ..	5
February ...	26	7 .. 26·9 ..	19
March ...	20	6 .. 30·0 ..	14
April ...	7	2 .. 28·5 ..	5
May ...	7	0 .. —	7
June ...	3	2 .. 66·7 ..	1
July ...	8	2 .. 25·0 ..	6
	104	37	67

**Age incidence.**—Among the 104 cases in the Navy 70, or 67·3 per cent., were under 20 years of age (83, or 79·8 per cent., being under the age of 25 years), and the number of cases progressively diminished in the succeeding decades. The percentage of deaths was lower under 20 years than in any of the succeeding decades. The average age of the 104 cases was 20·4 years, of the fatal cases 22·2, and of the recoveries 19·4 years. The extremes of age were 15 and 46 years.

Age periods.	Number of cases and percentage of the total 104 cases.	Deaths and percentage in the age periods.
15 to 19 .....	70 or 67·3 p.c.	20 or 28·5 p.c.
20 .. 29 .....	24 .. 23·1 ..	12 .. 50·0 ..
30 .. 39 .....	6 .. 5·8 ..	2 .. 34·4 ..
40 .. 49 .....	4* .. 3·8 ..	3 .. 75·0 ..
	104	37

\* The case which recovered was invalided, and died suddenly six months later, the coroner's inquest finding pneumonia as the cause of death.

<sup>1</sup> For this information I am indebted to Surgeon-Colonel R. J. Reece, B.A.C.

In the first year of the war 60·6 per cent. of the cases were under 20 years of age.

**Mortality.**—Out of the 104 cases 37, or 35·6 per cent., proved fatal; this contrasts favourably with the mortality of 90, or 52·9 per cent., among the 170 cases during the first year of the war.

**Ranks and ratings.**—There were two officers—a midshipman Royal Naval Reserve (aged 18), and a surgeon probationer (aged 21) who both recovered. The 102 ratings were as follows: Boys (seamen class) 39 (7 deaths); seamen 22 (11 deaths); stokers 13 (6 deaths); marines 11 (3 deaths); engine-room artificers 5 (2 deaths); officers' stewards 3 (all fatal, average age 20 years); carpenter's crew 2 (1 death); boy servants 2 (1 death); cook's mate 1 (recovery); plumber's mate 1 (recovery); armourer's crew wireman 1 (fatal); trimmer 1 (recovery); boy artificer 1 (fatal).

#### (2) Remarks on Some Clinical Aspects.

**Onset.**—The mode of onset sometimes varied from the common form characterised by fever, malaise, headache, and vomiting. Eight patients when first discovered were in an unconscious condition, and 3 of these had fallen out of their hammocks; one of these, with a graze on the forehead, blood about the nostrils, and vomiting, was regarded for some days as a case of fractured base. Of the 8 cases with this apoplectiform onset, 4 proved fatal. In 4 cases in February respiratory symptoms were so well marked as to suggest pneumonia or acute bronchitis. In 1 case the prominence of abdominal symptoms gave rise to an initial diagnosis of appendicitis.

In 11 cases at least the disease began very shortly (within three days) after going on leave (6 cases) or returning from leave (5 cases), and in some instances considerable fatigue must have been entailed by the length of the journeys. In one instance the disease appeared three days after arriving on leave at Gosport from the Grand Fleet. In the 5 cases in which the disease appeared shortly after returning from leave, the question of infection when on leave arises. In 13 cases the disease occurred within three weeks of joining the Service and exposure to the trials incident to this change of life. In 3 cases the disease followed the onset of measles after an interval of about ten days. As these cases were already under observation in hospital, it is improbable that the initial mottled rash of cerebro-spinal fever was regarded as measles. In two other cases the disease attacked patients already in hospital, for a lacerated finger and pleurisy respectively. In 5 cases (4 fatal) meningitis, in which the cerebro-spinal fluid was proved bacteriologically to contain meningococci, supervened on otitis. In isolated instances drunkenness and head injury (1 case), influenza, and vaccination (4 cases) immediately preceded the onset. In 1 case pneumonia and cerebro-spinal fever co-existed. These various factors may have so reduced the bodily resistance as to enable saprophytic meningococci in the naso-pharynx to invade the system.

**Rashes** were recorded in 51, or 49 per cent., out of the 104 cases; in 41 cases the rash was petechial or haemorrhagic, and 15, or 36·6 per cent., of these proved fatal, a mortality percentage very little higher than that (35·6) of all the 104 cases. In 1 case with a petechial eruption haemorrhagic bullae appeared on the ankles four days after the rash. In 5 cases there was a macular rash with 1 death, and in 5 cases a rose rash with 1 death. The mortality of the 51 cases with rashes was, therefore, 17, or 33·3 per cent.—namely, slightly lower than the mortality of the total 104 cases. In the first year of the war, rashes occurred in 102, or 62·6 per cent., of 163 cases, and the mortality of the cases with rashes was 52 (51 per cent.), or a little lower than that (52·9) of the total 170 cases. Although a very profuse haemorrhagic rash is extremely ominous, the occurrence of a rash is not necessarily of grave significance. The rash was nearly always noticed on the first or second day of the disease.

**Herpes** was noted in 21, or 20·2 per cent., of the 104 cases; in 20 cases the herpes was on the lips; in the remaining case it was in the distribution of the nasal branch of the ophthalmic division of the fifth nerve, but the cornea was not affected. In one of the cases with labial herpes there was also cervical herpes. In 14 cases there was also an initial rash; in 2 cases the rash and the labial herpes both occurred on the second day of the disease; in the remaining cases the herpes appeared later than the rash, on an average on the fourth day of the disease, the extremes being the second and

the eighth days. In some instances the labial herpes was very profuse. Of the 21 cases 4, or 19 per cent., proved fatal; this mortality is rather more than half that (35·6 per cent.) of the total 104 cases, and thus agrees with the ancient belief that herpes in cerebro-spinal fever, as in pneumonia, is a good prognostic. In the previous year herpes labialis was noted in 35, or 21·5 per cent., of 163 cases—almost exactly the same proportion as in the present series.

**Rarer manifestations and complications.**—Ocular symptoms. Photophobia, which has been stated to be rare,<sup>2</sup> was noted in 10 cases; conjunctivitis in 5, conjunctival haemorrhage in 2, panophthalmitis with loss of an eye in 2, strabismus in 8 (5 fatal); ptosis in 3 (2 fatal); nystagmus on the second day in 1 (fatal), and von Gräfe's sign in 1. Hemiplegia occurred in 1 case and weakness of the arm in another case, both of these were fatal; facial paralysis in 1 (fatal), dysarthria in 1 (recovery), and dysphagia in 1 (recovery). Delirium tremens occurred in 2 cases (1 fatal). Pericarditis was noted in 2 cases, both of which recovered. Recent endocarditis was found after death in 1 case (*vide infra*), and transient systolic murmurs were heard in 4 cases which recovered. Status lymphaticus was found after death in 1 case. Haematuria due to haemorrhagic cystitis and pyelitis was seen in 1 case, and 1 patient had polyuria for a few days, passing 8, 6, and 4 pints of urine daily, while the temperature was about 103° F. Epididymitis without any evidence of gonorrhoea occurred once.

Synovitis was noted in 4 cases (2 fatal) on the second, fifth, sixth, and ninth days of the disease; in 2 cases the knee was affected, in 1 the ankles and wrists, and in 1 the interphalangeal joint of a finger. All the cases had a petechial or haemorrhagic eruption; this fits in with the view that when purpura and synovitis are associated, the latter is due to haemorrhages into the synovial membrane. In the case with arthritis of the wrists and ankles on the fifth day of the disease, pericarditis with synovitis of the wrists, ankles, and knees developed on the ninth day; in spite of delirium tremens recovery followed. In the first year of the war there were 8 cases (2 fatal) of arthritis. Acute otitis supervened in 2 cases, both of which recovered.

**Relapses** during treatment are said not to be uncommon and generally to occur in cases of chronic hydrocephalus which terminate fatally. There was one case proved to be of this nature in a man, aged 19, the relapse which started after nine days of convalescence being ushered in by a rigor. In one case a true relapse or brief second attack occurred seven weeks after the temperature had been normal, and was followed by recovery (*vide infra*).

Mixed infections of the cerebro-spinal fluid were reported in 3 cases; pneumococci in 1 case without any obvious focus; and streptococci in 2 cases (one an otitic case, in the other infection occurred through the lumbar puncture).

**Diagnosis.**—Only those cases in which meningococci were found in the cerebro-spinal fluid have been accepted as cerebro-spinal fever. This criterion has very probably led to the rejection of some genuine cases of cerebro-spinal fever. But no clinical manifestation is pathognomonic of the disease. Thus a haemorrhagic rash, though highly suggestive, was present in cases proved bacteriologically to be due to other infections, such as pneumococci, or to be free from micro-organisms. The latter group of cases, though unsatisfactory, must be recognised.<sup>3</sup>

A fulminating case of meningitis with a profuse haemorrhagic rash occurred on Nov. 7th, 1915, in a cadet at Dartmouth. Bacteriological examination of the cerebro-spinal fluid, which was almost clear and contained a few red blood cells and occasional polymorphonuclear leucocytes, by Fleet-Surgeon H. C. Whiteside, R.N., failed to show any micro-organisms, the cultures were sterile, and no carriers were detected among 30 contacts. There was no necropsy. A brother died in infancy from meningitis believed to be tuberculous.

Cases with meningeal symptoms, which showed meningococci in the naso-pharynx but not in the cerebro-spinal fluid have been ruled out, as they may have been meningococcal carriers with meningism due to some other cause. In

<sup>2</sup> Foster and Gaskell. *Cerebro-spinal Fever*, p. 37. 1916: Cambridge.

<sup>3</sup> Among 121 cerebro-spinal fluids from cases of meningitis in the French Army Sacquépéte, Burnet, and Weissenbach (*Bull. Acad. de Méd., Par.*, 1915, lxxiv, 103-105) found 6 with the features of Widal's "puriform aseptic meningitis," in which no micro-organisms could be found by direct examination or cultivation.

this connexion it may be pointed out that during the acute stage of cerebro-spinal fever swabs from the naso-pharynx are often negative. Out of 33 cases of bacteriologically proved cerebro-spinal fever meningococci were found in the naso-pharynx in 7, or 21·3 per cent., only. This corresponds with von Lingelshaim's figures of 635 cases of cerebro-spinal fever with 146, or 22 per cent., positive cultivations from the naso-pharynx.<sup>4</sup>

Cerebral symptoms (meningism) accompanying acute infections, such as influenza, pneumonia, enteric, otitis, malaria, may closely imitate cerebro-spinal fever, and a certain diagnosis can be made only by lumbar puncture and examination of the cerebro-spinal fluid. Even if a patient has signs of pneumonia it is possible, as shown by isolated cases in both the recent epidemics in the Navy, that there is meningococcal meningitis as well.

From other forms of meningitis lumbar puncture and examination of the cerebro-spinal fluid constitute again the most reliable method of diagnosis. Even with pre-existing otitis it does not necessarily follow that meningococcal meningitis can be excluded; for, as mentioned above, in 5 cases (4 fatal) meningitis, in which the cerebro-spinal fluid was proved bacteriologically to contain meningococci, supervened on otitis.

Difficulty might arise in the diagnosis from the meningitic form of acute poliomyelitis in which all the symptoms of meningitis may be present, but "on lumbar puncture the cerebro-spinal fluid escapes under pressure, is clear, and on cytological examination may be found to contain an increased number of lymphocytes with a normal or sometimes a diminished sugar reaction and an increased amount of albumin" (Batten<sup>5</sup>). An outbreak in Devonshire and Cornwall in 1911 of what was at first thought to be cerebro-spinal fever was shown by R. J. Reece<sup>6</sup> to be one of acute poliomyelitis, and not one of acute poliomyelitis occurring concurrently with cerebro-spinal fever. In July, 1916, there was at Shotley an outbreak of 15 cases with the clinical symptoms of cerebro-spinal fever,<sup>7</sup> but 4 only were proved to be of this nature. Among the remaining 11 cases there was one only which could possibly be regarded as an example of the meningitic form of acute poliomyelitis.

In acute osteomyelitis of the spine lumbar puncture may give exit to pus from the extradural space. This occurred in 2 cases in the Royal Navy which will subsequently be published. In neither of these were there definite symptoms of cerebro-spinal fever, but Grisel<sup>8</sup> in a review of this form of osteomyelitis states that although in some cases the symptoms of compression are quite definite and disappear when the abscess is evacuated, there are others in which the association with meningitic symptoms and septicaemia renders the diagnosis very difficult.

The sequence of events in the two following cases is, perhaps, worthy of brief mention.

Two brothers from the Fair Isle, Shetland, had measles in September, 1915, in Haslar. One developed cerebro-spinal fever 13 days after the onset of measles and died. The other, who had never been well since the attack of measles, died in Haslar three months later from tuberculous meningitis. In both cases a post-mortem examination was made.

#### (3) Summary of the Results of Treatment.

Two out of the 104 cases were discovered after death only and, therefore, were not treated for the disease; 1 case (fatal) received soamin only; and 6 cases, of which 4, or 66·7 per cent., proved fatal, had lumbar puncture only. Therefore, out of 9 cases which did not receive serum 7, or 77·8 per cent., proved fatal.

Among the 95 cases treated by some form of serum the mortality was 30, or 31·6 per cent. This result, which is in striking contrast to the results of serum treatment in the first year of the war—105 cases with a mortality of 64, or 61 per cent.—fully justifies the serum treatment of the disease, and is compatible with the widely expressed view

<sup>4</sup> Quoted in the Report of the Special Advisory Committee upon Bacteriological Studies of Cerebro-spinal Fever during the Epidemic of 1915, p. 30.

<sup>5</sup> Batten, F. E.: Acute Poliomyelitis, p. 68, 1916. John Bale, Sons, and D. Paul, London.

<sup>6</sup> Reece, R. J.: Report of the Medical Officer of the Local Government Board, 1911-12, Appendix A, No. 4, p. 54. 1913.

<sup>7</sup> Fleet-Surgeon T. D. Halahan has recently published (*THE LANCET*, 1916, II, 1102) the details of these and some additional cases and urges that they were cerebro-spinal fever.

<sup>8</sup> Grisel, P.: Rev. d'Orthop., Paris, 1911, 3 ser., II, 145. I am indebted to Temporary Surgeon L. Pearce Gould, M.D., F.R.C.S., R.N., for this reference.

that the serums employed in this country during the first year of the war were largely deficient in antibodies. Flexner's serum, made under his direction at the Rockefeller Institute, New York, was not available during the first year of the war, but after the failure in this country of anti-meningococcal serum in the epidemic of 1915 the Rockefeller Institute reverted to the manufacture of the serum, and most generously placed a supply of a multivalent serum, made from 32 strains, at the disposal of the Royal Navy.<sup>9</sup> Other serums employed during this year, and not in the previous year, are Colonel Mervyn Gordon's various serums and the Pasteur Institute's multivalent serum. In the early part of the second year of the war, when the new serums were not available, Mulford's serum was given in a number of the cases, and throughout the year use was also made of the Lister Institute serum and of Burroughs Wellcome and Co.'s serum.

Of the 95 treated with intrathecal injections of serum, 60 did not receive any other form of specific treatment, and had a mortality of 18, or 30 per cent., which is a little lower than that (31·6) of the 95 cases. The remaining 35 cases received in addition one or more of the following forms of treatment: hypodermic or intramuscular injection of the serum, of vaccines or of soamin, or hexamine by the mouth, with a mortality of 12, or 34·3 per cent. In 23 out of the 35 cases the additional treatment was the simultaneous subcutaneous (or in a few instances intramuscular) injection of serum; this method was mainly adopted at Plymouth and Haslar; the mortality was 7, or 30·4 per cent. Vaccines were given in 8 cases, but did not appear, except perhaps in one or two instances, to exert any decided beneficial effect. The exact figures of the results of treatment are shown in the tabular form below:—

#### Tabular Summary of Treatment.

	Cases	Deaths.	Recoveries.
		Per cent.	Per cent.
Antimeningococcal serum—			
Intrathecally ... ... ... ...	95	30 or 31·6	65 or 68·4
Alone... ... ... ...	60	18 .. 30	42 .. 70
Combined with serum hypodermically, vaccines, soamin, or hexamine ... ... ... ...	35	12 .. 34·3	23 .. 65·7
Combined with serum hypodermically ... ... ... ...	23	7 .. 30·4	16 .. 69·6
Combined with vaccine... ... ... ...	4	3 .. 75	1 .. 25
Combined with vaccine, soamin, or hexamine ... ... ... ...	1	—	1
Combined with vaccine and hexamine ... ... ... ...	3	1	2
Combined with soamin ... ... ... ...	2	1	1
Combined with hexamine ... ... ... ...	2	—	2
Vaccines—			
(Never alone, always with intrathecal injection of serum) <i>vide</i> above ... ... ... ...	8	4	4
Hexamine—			
Alone... ... ... ...	1	1	—
Combined with intrathecal injections of serum, &c., <i>vide</i> above ... ...	6	1	5
Soamin—			
Alone... ... ... ...	1	1	—
Combined with intrathecal injections of serum, &c., <i>vide</i> above ... ...	3	1	2
Lumbar puncture (only) ... ... ... ...	6	4 .. 66·7	2 .. 33·3
Symptomatic treatment (only) ... ... ... ...	2	2	—

More than three-quarters of the 95 cases received serum within the first three days of the disease. From tabulation of 1211 cases Flexner found that when the serum was given within the first three days the mortality rate was 18 per cent., when between the fourth and seventh days 27·3 per cent., and when later than the seventh day 36·5 per cent., and therefore laid stress on the importance of early injection. In the 95 cases treated with serum in the Royal Navy this influence of time can also be seen:—

	Cases.	Deaths.	Recoveries.
1st to 3rd day ... ...	74	22 or 29·7 p.c.	52 or 70·3 p.c.
4th to 7th day ... ...	15	5 .. 33·8 ..	10 .. 66·7 ..
Later than the 7th ... ...	6	3 .. 50 ..	3 .. 50 ..

<sup>9</sup> Vide Amoss and Wollstein: A Method for the Rapid Preparation of Anti-meningitis Serum, Journ. Exper. Med., N.Y., 1916, xxii., 403.

The results obtained by the use of the various brands of serum are shown below in a tabular statement. Flexner's serum was employed in 39 cases altogether, with a mortality of 9, or 23 per cent.; in 27 of the 39 cases it was the only serum used, with a mortality of 6, or 22 per cent.; the 12 other cases in which other serums were given as well showed a mortality of 3, or 25 per cent. The other serums were given in much fewer cases. The mortality percentage of the 14 cases that received Burroughs Wellcome and Co.'s brand (alone or combined with other serums) was slightly lower than that of the cases treated with Flexner's serum; and the 16 cases treated by Gordon's various serums alone showed an even lower mortality,

Table showing Results of Treatment by Different Serums.

—	Cases	Deaths.	Recoveries.
		Per cent.	Per cent.
Flexner's serum alone ...	27	6 or 22·3	21 or 77·7
Combined with other serums ...	12	3 „ 25	9 „ 75
	39	9 or 23	30 or 77
Gordon's serums alone ...	16	3 or 18·7	13 or 81·3
Combined with other serums ...	6	3 „ 50	3 „ 50
	22	6 or 27·3	16 or 72·7
Pasteur Institute's multivalent serum } alone ...	9	4 or 44·5	5 or 55·5
Combined with other serums ...	5	1 „ 20	4 „ 80
	14	5 or 35·7	9 or 64·3
Burroughs Wellcome & Co.'s serum } alone ...	6	2 or 33·3	4 or 66·7
Combined with other serums ...	8	1 „ 12·5	7 „ 87·5
	14	3 or 21·4	11 or 78·5
Mulford's serum alone ...	10	5 or 50	5 or 50
Combined with other serums ...	2	1	1
	12	6	6
Lister Institute's multivalent serum } alone ...	11	6 or 54·5	5 or 45·5

The number of occasions on which serum was given intrathecally varied in the 95 cases from 1 to 8, according to the duration of the symptoms. In some instances the improvement and fall of temperature after the injection of serum were dramatic.

Sixteen cases received one dose only, and 7 proved fatal, 6 being very acute or fulminating cases; 25 received two doses of serum (8 deaths); 22 cases three doses (7 deaths); 8 cases four doses (1 death); 11 cases five doses (4 deaths); 5 cases six doses (2 deaths); 4 cases seven doses (1 death); and 4 cases eight doses (no death). In many cases lumbar puncture was performed more often than serum was injected; in 1 chronic case in which serum was given six times, lumbar puncture was performed on 20 occasions.

Serum rashes, erythematous or urticarial, were mentioned in 22, or 23 per cent., of the 95 cases treated by serum, but may have been more frequent. The rashes and articular manifestations were practically confined to cases treated with Flexner's and Burroughs Wellcome and Co.'s brands.

Out of the 22 cases 21 received either Flexner's or Burroughs Wellcome and Co.'s serum; 12 had Flexner's serum alone, 2 Flexner's and Gordon's serum, 1 Flexner's and the Pasteur Institute's multivalent serums, 2 Burroughs Wellcome and Co.'s serum alone, 1 Burroughs Wellcome and Co.'s and Gordon's serums, and 3 Flexner's and Burroughs Wellcome and Co.'s serum (only 4 cases had this combination). The remaining case had 70 c.c. of Gordon's serum, and did not have any manifestations of serum disease except the rash. Out of the 95 cases treated with serum, 41 had Flexner's or Burroughs Wellcome and Co.'s serum, and among them rashes occurred in 21, or 51 per cent.; whereas among the remaining 54 cases treated by serum there was a rash in one case only. Six of the 22 cases with rashes also had serum hypodermically. The average amount of serum received by the cases with rashes was 65 c.c.; and the average amount received by 14 other cases which had Flexner's or Burroughs Wellcome and Co.'s serum and recovered was 70 c.c., or practically the same.

On an average the rash appeared ten days after the first injection of serum. In a case at Haslar which received one injection of 20 c.c. of Flexner's serum in a relapse seven weeks after the primary attack in Egypt, there was within a few hours an "immediate" serum rash. The patient stated

that nine lumbar punctures had been performed in the primary attack, but there is no official information as to the administration of serum.

Of the 22 cases none proved fatal, but as the serum rash occurs after an interval of about ten days, the fulminating and acute cases are obviously excluded, and this observation has no prognostic value. Six cases had both herpes and a serum rash; 9 cases an initial rash and a serum rash; and 3 cases an initial rash, herpes and a serum rash (in one case on two occasions); presumably in these instances the skin was especially prone to react.

In some cases pains in the joints without effusion accompanied the serum rash, and in two instances effusion into the joints and a temperature of 102° coincided with the rash. In 2 cases at Chatham temporary deafness occurred at the same time as a serum rash and arthralgia, and was regarded by Temporary Surgeon A. C. McAllister as a manifestation of serum disease.

Grave accidents due to intrathecal injection of anti-meningococcic serum were very rare.

In one case lumbar puncture was done directly after admission to the Royal Naval Hospital, Plymouth, and 50 c.c. of turbid fluid containing meningococci spurted out; 15 c.c. of Gordon's multivalent serum was given intrathecally and the same quantity hypodermically. Respiration stopped at once. The necropsy showed fibrinous adhesions and purulent streaks over the cerebral sulci, with but little exudation at the base of the brain. Both lateral ventricles were distended with blood-stained serum. The purulent exudate over the hemispheres suggested that the illness had last a week. In another case at Plymouth lumbar puncture on the third day of the disease gave exit to 30 c.c. of turbid fluid, and 15 c.c. of Gordon's multivalent serum were injected intrathecally; five hours later respiration stopped before the pulse. The necropsy showed fibrino-purulent exudate over the base of the brain and much yellowish fibrin over the pons and medulla, turbid and blood-stained fluid in both ventricles, oedema of the cerebellum pressing on the pons, dilatation of the right side of the heart, and recent and old endocarditis of the mitral valve. Although death did not occur until five hours after the injection of serum, this case resembles the first in the presence of blood-stained fluid in the lateral ventricles of the brain. In a third case death occurred suddenly seven hours after injection of serum and the necropsy showed distension of the lateral ventricles and acute congestion and oedema of the cerebellum pressing on the pons.

In a man who had had six lumbar punctures the site of the punctures became inflamed and death rapidly followed; at the necropsy it was found that the lateral ventricles were greatly distended with pus swarming with streptococci.

In 2 cases lumbar puncture gave rise repeatedly to severe headache, which was partially relieved when serum was injected intrathecally.

#### FOUR CASES OF HEMIPLEGIA CAUSED BY EMBOLISM FOLLOWING GUNSHOT WOUNDS OF THE CAROTID ARTERIES.

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A SERIES of 14 cases has recently been reported by Sir George Makins<sup>1</sup> in which symptoms of cerebral embolism followed gunshot injury of the carotid arteries. Of these cases only one ended fatally, and in it a post-mortem examination was not available, so that a complete anatomical account of the conditions could not be obtained. Four similar cases, presenting the remarkable clinical picture of a wound in the neck accompanied by hemiplegia and loss of consciousness, and all ending fatally, have come under observation in a casualty clearing station. As a necropsy was performed in every case they appear worthy of record.

CASE 1.—In this case there was a small wound on the left side of the neck, below and behind the angle of the jaw; the exit wound was also on the left side, lower down, about 1½ inches from the middle line behind. An extensive diffuse swelling appeared behind the angle of the jaw; this

swelling did not pulsate, nor was there any bruit. The patient was unconscious and stertorous, and there was hemiplegia affecting the face, arm, and leg on the right side. The patient died about 26 hours after being wounded.

On dissection of the left side of the neck there was noted a localised swelling, with haemorrhage, on the walls of the external and internal carotid arteries, just above the bifurcation of the common trunk. Two small wounds, with ragged edges, were present, one on the front of the external and the other on the back of the internal artery; these appeared to be sealed up by firm red thrombus which was entangled in projecting shreds of the adventitial tunics, and the thrombus on the back of the inner vessel exhibited a firm pea-like projection backwards. A probe which was readily passed, with light pressure, in at one opening and out at the other evidently traversed the lumina of both arteries. The vessels were removed unopened, the internal carotid being cut across half an inch from the base of the skull. Its lumen was patent at that level, but was filled by thrombus to a point just below. When fluid was poured into the common carotid artery it was observed to make its exit by the external artery, none escaping by the wounds. The lumen of the left internal carotid artery was observed to be patent also at the point where it was cut in removing the brain. The left middle cerebral vessel was normal to a point just beyond the origin of its perforating branches, but was there distended and completely blocked by a red adherent thrombus. The *Bacillus perfringens* was present in this clot in considerable numbers. There was a well-marked condition of early softening of the left hemisphere of the brain, excepting the occipital and frontal lobes. The basal nuclei were normal.

CASE 2.—In the second case there were multiple small bomb wounds, one of which was on the right side of the neck posteriorly. There was a similar non-pulsatile swelling of the neck, and the symptoms produced were similar to those in the first case. The patient died, hemiplegic on the left side, about 18 hours after being hit.

On post-mortem examination much effused blood was present in the tissues of the right side of the neck. The missile, a small fragment of bomb-casing, was seen lying under the right sterno-thyroid muscle, having penetrated the right lobe of the thyroid gland. There was a false aneurysm, about an inch in diameter, on the deep internal aspect of the right common carotid artery; its wall was formed of firm fibrin mixed with blood corpuscles. On slitting up the vessel after removal, a linear wound,  $\frac{1}{2}$  inch in length, was seen on its posterior and inner wall about  $1\frac{1}{2}$  inches below the bifurcation. A firm cylindrical thrombus was adherent to the upper end of this wound and extended upwards for a distance of  $1\frac{1}{4}$  inches, lying free in the lumen and only partially filling it. The external and internal carotids were free of thrombus as far as they could be traced in the neck, and the latter was patent also at the point where it was cut inside the skull in removing the brain. The right Sylvian artery was completely occluded by firm red thrombus just beyond the origin of its perforating branches. The right hemisphere of the brain showed well-marked early softening, with the exception of the frontal and occipital poles.

The grey matter was swollen, red, and oedematous and had a blurred margin, and contrasted with the normal left side. The basal nuclei were intact.

CASE 3.—This case was admitted within six hours of being wounded with the same symptoms of stertor and hemiplegia. The patient had been shot through the neck from side to side. On the right side there was a small wound near the posterior border of the sterno-mastoid muscle, about midway between its attachments. Arterial blood escaped freely from this wound when the dressing was removed. The right common carotid was therefore ligatured just above the omo-hyoïd; the haemorrhage was thereby arrested. The patient died without any alteration in the symptoms within 15 hours of being wounded.

In this case a false aneurysm about the size of a walnut was found on the back of the right external carotid artery just above the bifurcation of the main trunk.

(Fig. 1.) A small perforation about  $\frac{1}{8}$  inch in diameter was present in the posterior wall of the vessel at that level. The

edges of this wound were ragged and bruised, and the opening was crossed by some residual strands of adventitia with clot adherent to them. The posterior wall of the internal carotid artery was much bruised at a slightly lower level, but was not perforated. Fairly firm greyish-pink thrombus was adherent on the walls of the common carotid artery at its bifurcation, and extended  $\frac{1}{2}$  inch upwards in the lumen of the internal and  $1\frac{1}{2}$  inches in that of the external vessel, being firmly attached over the bruised areas of intima. The external carotid was the only vessel completely occluded by thrombus. Emboli were present in several branches of this vessel in the neck; the lumen of the internal carotid was free of clot from just above the injury on its wall to its termination inside the skull. The right middle cerebral vessel was normal at its origin, but all the larger branches in the Sylvian fissure were filled by portions of thrombus of the same consistency as that seen in the large vessels in the neck. The island of Reil and the motor area of the right cerebral hemisphere were softened and much congested, while the basal nuclei and the poles of the hemisphere remained normal. A few streptococci were present in films from the thrombi, and a few colonies were obtained on cultivation.

CASE 4.—This case was admitted about six hours after being wounded, already in the same condition, stertorous, and with hemiplegia affecting the face, arm, and leg on the right side. There was a wound on the left side of the neck, about  $2\frac{1}{2}$  inches above the clavicle. This patient survived for about 72 hours after being wounded.

Post mortem the left common carotid artery was found to be completely severed and the ends, filled with thrombus, were retracted so as to leave a gap half an inch in length. (Fig. 2.) The ends of the vessel were much bruised and some laceration was present for half an inch upwards on the walls of the upper segment. The thrombus in the lower segment was traced downwards to within an inch of the aorta; that in the upper extended up to the bifurcation of the common carotid, and thence for a considerable distance into the external carotid and its branches and for half an inch only into the internal carotid. The lumen of the latter vessel was patent above that level. On the base of the brain the left Sylvian artery was plugged by firm red thrombus beyond the origins of the perforating branches. This had given rise to cerebral softening, as in the previous cases.

In each of these cases the hemiplegia and cerebral disturbance were caused by occlusion of the middle cerebral artery or its branches. In all four there was thrombus present in the carotid arteries in the neck, consequent on damage of the arterial walls, and in each there were several inches of the internal carotid artery patent between that thrombus and the portion blocking the cerebral vessel. It is consequently a justifiable conclusion that the blood continued to flow for a time, at least, in the wounded vessels, and that the occlusion of the cerebral arteries occurred by embolism. Similar emboli were found in one instance in the branches of the external carotid also.

The damage to the large cervical arteries was in every case considerable. In three there was actual perforation of the wall; in the fourth the trunk was found completely severed, but this, no doubt, occurred secondarily by sloughing, after the vessel was fully thrombosed. It is remarkable that haemorrhage was so slight in these cases; in only one of them was ligature necessary.

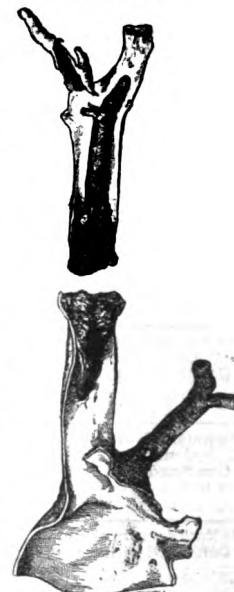
Sir George Makins draws attention to the tardy development and partial nature of the paresis as outstanding



The carotid arteries from Case 3, showing the false aneurysm and the thrombi inside the vessels. The perforation in the wall of the external carotid is quite obscured by thrombus.

(Fig. 1.) A small perforation about  $\frac{1}{8}$  inch in diameter was present in the posterior wall of the vessel at that level. The

FIG. 2.



Illustrates the complete separation of the common carotid artery, and the sealing of the ends by thrombus. The shape and arrangement of the thrombi indicate that they have formed while the blood was still circulating.

features in his series, and contrasts this with the prompt and complete hemiplegia, followed by a fatal issue in 24 to 36 hours, which may occur after ligature of the common carotid artery. In the four cases related, however, the early appearance and completeness of the hemiplegia and the rapidly fatal issue resemble the effects of ligature of the common carotid. It is natural that such cases, only surviving from 15 to 72 hours, would not reach a base hospital.

We are indebted to the Medical Research Committee for permission to make use of the two drawings by Mr. A. K. Maxwell.

## ON THE PRESENCE OF AN ACCESSORY FOOD FACTOR IN THE NASAL SECRETION

AND ITS ACTION ON THE GROWTH OF THE MENINGOCOCCUS AND OTHER PATHOGENIC BACTERIA.

(Preliminary Paper.)

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(Report to the Medical Research Committee.)

### 1. Introduction.

In dealing with numbers of cerebro-spinal fever contacts during the recent epidemic it was noticed that the growth of the meningococcus was in some instances strongly influenced by the amount of nasal secretion transferred by the swab to the surface of the culture medium. It was found from experiment that if a trace of dilute sterile nasal secretion was added to the surface of the culture medium, it brought about a rapid growth of the meningococcus when this medium was subsequently inoculated with this germ. The growth is always many times the amount obtained on the same medium, on planting out a similar quantity of culture, in the absence of nasal secretion.<sup>1</sup>

The action of sterile dilute nasal secretion in accelerating the growth of the meningococcus would seem to be entirely in the nature of an accessory food body or vitamine, as alone this secretion is quite incapable of supporting or stimulating the growth of this germ. This conclusion is supported by its peculiar properties. It is soluble in water, slightly soluble in alcohol, and almost insoluble in ether.<sup>2</sup> It has great heat-resisting capacity, withstanding autoclaving at 120° C. and boiling in strong hydrochloric acid for 12 hours without losing strength. On filtration it always undergoes considerable adsorption, even when passed through an ordinary filter-paper, and it almost entirely disappears from any fluid when this is passed through a Doulton filter candle. All chemical manipulation, drying, precipitation, &c., appreciably weaken its power of stimulating the growth of the meningococcus.

In addition to the meningococcus and its allies, it has been shown to accelerate the growth of the pneumococcus, *B. typhosus*, *B. coli communis*, various faecal streptococci, and a number of throat bacteria. It is highly probable that it will accelerate the growth of all pathogenic bacteria when added in sterile fashion to any suitable culture material, whether solid or fluid.<sup>3</sup>

### 2. Mode of Collection of Nasal Secretion.

The nasal secretion used in the following experiments was obtained either by collection direct from the naso-pharynx by means of a suction pump, or by the employment of naso-pharyngeal swabs such as those used in the routine swabbing of cerebro-spinal fever contacts. This

<sup>1</sup> If sterile dilute nasal secretion be tested against the action of sterile dilute oral saliva in stimulating the growth of the meningococcus, it will be found that oral secretion has also some power in this respect, but this is much less than with nasal secretion. Gordon has shown (Brit. Med. Jour., June 17th, 1916, p. 849) that in the sterile state oral saliva has a marked inhibiting action on the growth of this germ. When the various mouth bacteria were removed from this secretion by sterilisation or the centrifuge, this inhibiting action immediately disappeared.

<sup>2</sup> It can be precipitated with phosphotungstic acid and neutral lead acetate, but this needs further confirmation.

<sup>3</sup> In the experiments described in the present paper the medium used is Crowe's "chocolate medium" (see THE LANCET, Nov. 20th, 1915). In other experiments similar results have been obtained with Gordon's legumen tryppagar.

latter method proved the most convenient. These swabs are made of ether-washed cotton-wool placed on the ends of flexible wires which are introduced into the naso-pharyngeal region through the mouth retracted within bent glass tubes, so that all contamination from the oral secretion is avoided. The swabs were then extracted in distilled water. It was found that quite a considerable amount of secretion could be obtained in this way. This will be referred to in the following experiments as "dilute" nasal secretion in distinction to that collected "undilute" direct from the mucous membrane of the naso-pharynx, by means of the pump.

### 3. The Preparation of Various Extracts of Nasal Secretion.<sup>4</sup>

(a) General treatment in the preparation of aqueous, alcoholic, and ethereal extracts. The cotton-wool was removed from the swab wires and covered with the solvent in glass-stoppered specimen tubes of suitable size, using 1-2 c.c. for each swab. After standing for 24 to 48 hours, the liquid was removed with a pipette, and filtered through a 5 c.c. Swedish acid-extracted filter-paper. Aqueous extracts which were further treated, and all alcoholic and ethereal extracts, were evaporated to dryness on a tepid water-bath at a temperature of about 60° C., the basin being removed before it was absolutely dry when water was the solvent, and then taken up in distilled water, 1 c.c. of water being allowed for each swab extracted.

(b) Preparation of hydrolysed nasal secretion. 3 c.c. of undilute nasal slime was heated with ten times its volume of strong HCl in a test-tube standing in boiling water for six hours. More HCl was added to make up for the loss by evaporation, and the heating continued for six hours more. The solution, which was faintly yellow, was transferred to a porcelain dish and the excess of acid was evaporated off on the water-bath with the continual addition of water. When nearly all the acid had been removed the remainder was dried at a low temperature, dissolved in 7 c.c. of water, and made faintly alkaline to litmus paper with N/10 NaOH, about 5 c.c. being necessary.

All the extracts before being sealed up in vaccine tubes were tested and their alkalinity adjusted as closely as possible to Ph. = 7.35 of Sorenson's scale. The extracts after being sealed up were finally sterilised at 55° C. for an hour. All manipulation of the extract was conducted in beakers of Jena glass, or Berlin porcelain or platinum, and great care was taken to have all glassware, especially the slides used for mixing the dilutions, clean and free from any chemicals. The distilled water used was redistilled from glass several times.

### 4. Method of Testing the Action of Extracts.

The action of the various extracts of nasal secretion in stimulating the growth of the meningococcus and other bacteria was tested by making a number of dilutions of the germ in the extract, and planting out each dilution separately and comparing their growth, with a similar quantity of the same emulsion diluted in a similar manner in distilled water or Ringer's solution, and planted out in the same way. It was found after several trials that distilled water offered the best form of control. In the following experiments care was always taken to make the control dilution first and to plant it out immediately. Thus all harmful action of distilled water on the germ was minimised as much as possible.<sup>5</sup> Where typhoid and coli organisms were used all emulsions and controls were made in Ringer's solution.

A large number of methods of dilution were tried. The one found most useful consisted in taking up in a calibrated pipette, finely throttled to ensure accurate measurement, nine volumes of the fluid to be tested, each volume representing 25 c.mm. of liquid. They were then spread out separately on sterile slides. Then with a smaller pipette, also throttled, 5 c.mm. of a standard emulsion<sup>6</sup> of the meningococcus (5000 million to the c.c.) in Ringer's solution, was drawn up. This was added to the first of the 25 c.mm. volumes on the slide and thoroughly mixed by drawing it up to a fixed

<sup>4</sup> For the proper preparation of the extracts the Medical Research Committee have kindly placed the services of Mr. D. Matthews at my disposal.

<sup>5</sup> I have shown elsewhere (THE LANCET, 1916, II., 902) that the meningococcus is peculiarly resistant to the hypotonic action of distilled water. I have shown that it can withstand its action for many hours without experiencing any apparent ill-effect.

<sup>6</sup> In speaking of a "standard emulsion" of the meningococcus in the following experiments it will always be understood that one in Ringer's solution of the strength of 5,000,000,000 cocci to the cubic centimetre is meant.

mark each time in the process of mixing. Then from this 5 c.mm. was taken up and transferred to the second 25 c.mm. volume and the mixing repeated. This procedure was gone through in succession with each of the nine volumes. Thus in the end a series of nine successive dilutions of the germ were obtained. Then by means of a fine sterile camel-hair brush or fine capillary tube, a certain quantity of each dilution was transferred in turn to the surface of the culture medium, commencing with the highest and gradually working down to the lowest dilution. The quantity transferred could be accurately measured when a capillary tube was used, but when a brush was employed it was only roughly the same in each instance. The dilutions were spread on the surface of the culture medium by dipping the brush in one of them and then drawing it rapidly across the surface of the plate. This operation was repeated in turn with each of the dilutions. Thus a series of nine parallel lines were obtained on the plate, each representing a particular dilution of the germ in the solution to be tested.<sup>7</sup>

##### 5. Experiments.

**Experiment I.** (Figs. 1 and 2).—A "standard" emulsion of an old laboratory culture of meningococcus (Littledale) was made up in Ringer's solution. 5 c.mm. of this emulsion was added to 25 c.mm. of distilled water and of an aqueous extract (see under Sec. 3a) of dilute nasal secretion respectively, and diluted down through nine successive dilutions, and planted out by means of a brush as described under Sec. 4. Thus nine parallel lines, as shown in Figs. 1 and 2, were obtained on the plates,<sup>8</sup> one representing the dilution in nasal secretion extract and the other the control dilution in distilled water. Line No. 1 contains the fewest number of germs, while line 9 contains the largest number. Each line contains very roughly the same number of germs as the corresponding line on the other plate. The plates were incubated at 37° C. for 24 hours and then taken out and the resulting growth photographed. The photographs show the plates reduced to half natural size.

In Fig. 1, showing the dilution in distilled water, little growth has taken place except on lines 7, 8, and 9. In the same degree of dilution in aqueous extract of dilute nasal secretion, Fig. 2, considerable growth has taken place on all the lines, and is confluent in the case of lines 7, 8, and 9. A comparison of the two photographs gives a rough idea of the accelerating action of nasal secretion on the growth of the meningococcus.

It was immaterial whether, in this experiment, Ringer's solution was substituted for distilled water in the control dilutions to obviate all possible harmful action of the distilled water; the result was the same. There is possibly a slight increase in the growth obtained in the control, due to the use of Ringer's solution, but this increase was not sufficient to alter the main result of the experiment. There was always a preponderating growth with nasal secretion extract.

**Experiment II.** (Figs. 3 and 4).—In this experiment, instead of an old laboratory culture being used as in Experiment I., a freshly isolated strain of the meningococcus (Walters) was taken. This had been obtained from the spinal canal of a cerebro-spinal fever patient about a week previous. In this instance the dilutions of a "standard" emulsion were made as before in distilled water and nasal secretion (aqueous extract), but instead of a small quantity of each dilution being transferred to the plates by means of a brush, each dilution containing 30 c.mm. of fluid was transferred by means of a fine capillary pipette to the surface of the culture medium. Thus, instead of a series of lines, a series of drops or blebs were obtained representing 11 consecutive

dilutions of the germ in distilled water and nasal extract respectively.

A comparison of Figs. 3 and 4 shows the accelerating action of the nasal secretion extract over that of the distilled water one. The figures, however, hardly bring out the proper difference between them, as the spreading of the drops on the surface of the medium has been irregular. Actual inspection of the plate, Fig. 4, shows, for instance, that dilution No. 11, which contains the fewest number of organisms, is very thin and spread out, while No. 1, which contains the largest number of germs, is very heaped up and thick, a condition which is not very obvious from the photograph.

The comparison of dilutions 7-11 of Fig. 4 with the same dilutions in Fig. 3 dispels any doubts as to the accelerating action again of nasal secretion in this experiment.

**Experiment III.**—In this experiment it was sought to find out the amount of accelerating action nasal secretion extract brought about on the growth of the meningococcus when growing in a fluid broth medium and not a solid medium as in the former experiments. To two small vaccine tubes containing each 2 c.c. of sterile glucose litmus broth 5 c.cm. of "standard" emulsion of meningococci (Walters) was added. To one of the tubes in addition 5 c.cm. of an aqueous extract of dilute nasal secretion was added. The tubes were then incubated for 48 hours at 37° C. At the end of this time the tube that had received the nasal secretion in addition to the meningococci had entirely lost all trace of pigment, while that which was without the extract still retained a certain amount of reddened litmus pigment. The tubes were then carefully shaken up to ensure an even distribution of the cocci, and counts were made of a certain volume of fluid from each tube. This showed that there was roughly eight times the number of cocci per c.mm. in the tube with the nasal extract as compared with that without it.

**Experiment IV.**—In this experiment an attempt was made to see if prolonged boiling of aqueous extract of dilute nasal secretion had any action in destroying its power to stimulate the growth of the meningococcus. 4 c.c. of an aqueous extract of dilute nasal secretion was boiled continuously for five hours, distilled water being added from time to time to keep it at the same volume. (See Sec. 3 b.) It was then tried out as before, against some of the same aqueous extract unboiled, with a "standard" emulsion of meningococcus (Littledale). It was found that the boiling had had but little or no effect in weakening the action of the nasal secretion.

**Experiment V.** (Figs. 5, 6, and 7).—In this experiment hydrolysed nasal secretion prepared by boiling undilute nasal slime with strong hydrochloric acid for 12 hours (as described in Sec. 3 (b)) was tested against the action of the same nasal secretion untreated with HCl. Dilutions of a "standard" emulsion of a freshly isolated culture of meningococcus (Lake) were made in distilled water (control), nasal slime, and nasal slime hydrolysed, respectively. These were planted out on a plate by means of a brush in the usual way.

Photographs 5-7 show the result of this experiment. It will be seen that the hydrolysed nasal secretion is as active in accelerating the growth of the meningococcus as the same secretion untreated (Figs. 6 and 7). The action of both hydrolysed and the non-hydrolysed secretion in accelerating growth is well shown by comparison of these plates with that planted out with the control dilutions in distilled water. This experiment has been repeated a number of times with different strains of meningococci and always gave the same result.

**Experiment VI.** (Figs. 8-11).—To determine the relative power of a plain alcoholic extract of dilute nasal secretion, as compared with a plain aqueous extract and an ether extract of the same in stimulating the growth of the meningococcus. Dilutions of a standard emulsion of meningococcus (Paul) were made as before. The diluents were distilled water (control), aqueous extract of dilute nasal secretion, plain alcoholic extract of dilute nasal secretion, and ether extract of the same. Figs. 8-11 show the resulting growth obtained after 24 hours' incubation at 37° C. Comparison of Fig. 10 with Fig. 9 shows the action of a plain alcoholic extract of dilute nasal secretion to be almost as active as that of an aqueous one, while comparison of both these figures, with the control in distilled water (Fig. 8) shows the amount of acceleration in growth produced.

The conclusion drawn from this experiment was that the active principle in nasal secretion which accelerates the

<sup>7</sup> If we commence with an emulsion of 5000 million meningococci to a cubic centimetre, and make nine consecutive dilutions of 5 parts in 30 in each dilution, then theoretically we should expect to find in each of the nine dilutions the number of cocci per cubic centimetre as follows:—

Dilution.	Cocci.	Dilution.	Cocci.
1 .....	833,000,000	6 .....	170,000
2 .....	139,000,000	7 .....	18,000
3 .....	23,000,000	8 .....	3,000
4 .....	4,000,000	9 .....	500
5 .....	640,000		

These numbers were never actually approached in the following experiments, as the pipettes and brushes were not sterilised in passing from one dilution to another.

<sup>8</sup> The numbering of the experiments is only for the convenience of the present paper; many of the experiments described have been repeated a great many times.

<sup>9</sup> All the experiments described in this paper refer to implantations on Crowe's "chocolate medium."

EXPERIMENT I.—*Meningococcus "Littledale."*

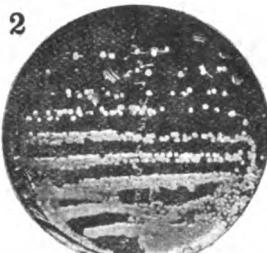


FIG. 1.—Dilutions in distilled water. (Control.)  
FIG. 2.—Dilutions in aqueous extract of sterile dilute nasal secretion.

EXPERIMENT V.—*Meningococcus "Lake."*



FIG. 5.—Dilution in distilled water. (Control.)

EXPERIMENT II.—*Meningococcus "Walters."*

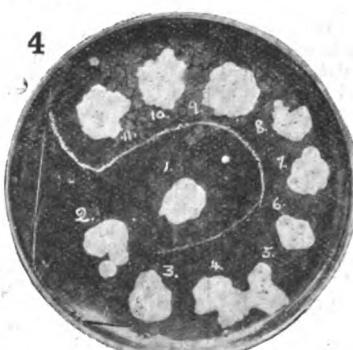
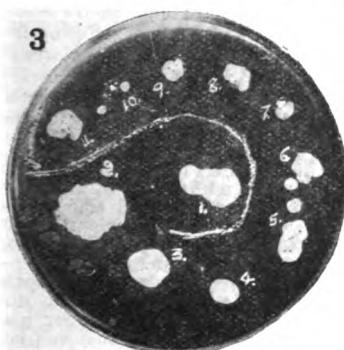


FIG. 3.—Dilutions in Ringer's solution.  
FIG. 4.—Dilutions in dilute aqueous extract of nasal secretion.



FIG. 6.—Dilution in aqueous extract of dilute nasal secretion.

EXPERIMENT VI.—*Meningococcus "Paul."*



FIG. 8.—Dilutions in distilled water.  
FIG. 9.—Dilutions in aqueous extract of nasal secretion.



FIG. 7.—Dilution in hydrolysed nasal secretion.

EXPERIMENT VII.—*B. typhosus.*



FIG. 10.—Dilutions in alcoholic extract of nasal secretion.  
FIG. 11.—Dilutions in ether extract of nasal secretion.



FIG. 12.—Showing the action of dilute nasal secretion in stimulating the growth of *B. typhosus*. The upper half of the plate shows the dilutions of the germ in Ringer's solution, while the lower half shows the dilutions in dilute aqueous extract of nasal secretion.

Cultures (one-third natural size) photographed after 24 hours' growth. The streaks are to be read from above downwards.

growth of the meningococcus is soluble in distilled water, less so in alcohol, and almost insoluble in ether.

*Experiment VII.* (Fig. 12).—To determine the action of nasal secretion extract on the growth of *B. typhosus*. In Fig. 12 the upper half of the plate has been planted out in the usual way with dilutions of an emulsion of *B. typhosus* in Ringer's solution; in the lower half, with dilutions of the same emulsion in aqueous extract of dilute nasal secretion. Fig. 12 shows that a much more abundant growth took place on that half of the plate which received the nasal secretion.

The conclusion drawn from this experiment was that the growth of *B. typhosus* is accelerated in a similar manner to that of the meningococcus by an aqueous extract of dilute nasal secretion.

Similar results were obtained in experiments with the following germs:—*Streptococcus zymogenes*, *Micrococcus pharyngeus flarus*, *pneumococcus*, and *B. coli communis*.

#### Conclusion.

The outstanding results of the foregoing experiments show that in nasal secretion there is present some body which greatly accelerates the growth of the meningococcus on an artificial culture medium. Alone it is incapable of acting as a food or stimulant to the growth of this germ. It is soluble in water, less so in alcohol, and very insoluble in ether. It has great heat-resisting power, being able to resist prolonged boiling for many hours. It is not destroyed by boiling in the presence of strong hydrochloric acid for twelve hours. In addition to the meningococcus it also stimulates the growth of many other pathogenic germs.

## A NOTE ON THE CAUSE AND PREVENTION OF TRENCH FOOT.

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No one who has had an opportunity of observing many cases of trench foot, particularly in the later stages of the disease, can have failed to be struck with certain characteristics presented by it. The lesions are indolent, slow to heal, and prone to break down again on the slightest provocation. The scar tissue formed is weak and ulcerates easily. Indeed, the whole picture of the disease reminds one irresistibly of the trophic sores appertaining to diseases of the central nervous system. I wish to set forth in this paper my reasons for thinking that trench foot is an affection of a trophic nature.

Some three years ago a book on electro-pathology was published by Mr. A. E. Baines, a distinguished electrical engineer. Space does not permit me to give an account of the far-reaching vista of promise which this little-known work has opened up to medicine. An abler pen than mine has recently put the whole matter before the profession. Let it suffice to say that Mr. Baines believes that the brain, and possibly the cord, is the seat of electrical generation, and that the current so generated is carried to the tissues by means of the nerves, which to the electrician's view are nothing but insulated cables. Here we have the trophic influence of physiology and medicine, that vague generalisation which from our student days we have been content to accept without questioning. Mr. Baines has shown us how to measure and modify this trophic influence, and I venture to predict that in the future his name and fame will equal that of those illustrious ones, Simpson, Lister, and Koch, as benefactors of the human race. This is no mere discovery of an isolated fact in medicine. Many a patient worker has given his brick, his hard-wrought stone of research to the building of the sacred fane of *Asculapius*. As is perhaps fitting and proper for an engineer, Mr. Baines has come and shed a flood of light in our temple. For he has given us a fundamental principle.

The dominating factor in the conditions under which trench foot occurs is wet. When a man is standing for days on end in water and liquid mud, his boots, socks, and the skin of his feet and legs become soaked. As is well known, the electrical resistance of the skin is enormously diminished when the skin is wet. Under these conditions a gradual leakage of electricity to earth takes place from the feet. Other things being equal, electricity will always leak

from a point in preference to a plane surface, which accounts for the fact that the toes are most affected. This leakage deprives the cells of the foot tissues of their trophic influence and they die. Hence the lesions of trench foot.

Local leaks of electricity may be detected by a suitable galvanometer. One pole of the galvanometer should be connected to a silver plate about the size of a florin, which is fixed in the centre of the patient's forehead; there is no special reason for fixing it on the forehead except that it is the most convenient spot in the middle line of the body. The other pole is connected to a contact plate mounted in an insulated handle so that the contact or electrode can be placed on any portion of the body it is desired to test. Before testing it is necessary to "earth" the patient in order to dissipate any induced charge of electricity of which he may be the host. If this is not done the patient's own intrinsic current may be swamped by charges he has picked up from trams, electric trains, or other sources. With both poles in contact with the body the galvanometer will give a deflection. When leakage is taking place from any particular area a high and rapid deflection is noted. I have been examining and treating various cases on Baines's principles for a matter of about two years, and have found such a leakage taking place from the feet and legs of soldiers suffering from trench foot whom I had under my care last spring. Moreover, the results I obtained by treating these cases by dielectric oil were better than the results obtained by any other method I tried. I also made a few experiments bearing on this subject.

*Experiment 1.*—With the aid of Miss Flecker, at the Ladies' College Physical Laboratory, Cheltenham, I estimated the electrical resistance of a piece of oak tanned sole leather 3 inches long by 1 inch wide. We found that when dry the resistance was practically infinity. When wet the resistance is that of the fluid the leather has soaked in.

*Experiment 2.*—One pole of the galvanometer was connected to an electrode which could be held in the hand. The other pole was connected by an insulated cable to a copper plate imbedded in the earth. Another insulated cable was connected at one end to the metal pipe supplying water to the house, and at the other end to a brass rod of 1 inch section. After earthing myself I held the brass rod in one hand and the electrode in the other, and obtained a rapid off-scale deflection, showing, firstly, that an electric current was coming from my body; and secondly, that the earth connexions were working properly, for the current passed out by one hand through the brass tube to the water pipe, thence about 20 feet through the earth to the copper plate, and through the galvanometer to the other hand, so completing the circuit.

*Experiment 3.*—The brass tube was then laid on the floor which was covered by a thick carpet. I held the electrode by one hand and put both feet on the brass tube. I wore ordinary boots which were dry. No deflection was obtained because the dry leather soles of my boots insulated me from the earth. I then took my boots off and put my bare feet on the tube and obtained an off-scale deflection.

*Experiment 4.*—Next day was wet and I walked about half a mile so that the soles of my boots, which were free from holes and metal nails, became wet. On holding the electrode in one hand and placing my feet on the brass tube, a rapid off-scale deflection occurred, showing that current was passing through my boots to earth.

*Experiment 5.*—The pole of the galvanometer connected to earth by the copper plate was disconnected. It was reconnected to a hand electrode exactly like the one previously used, so that the galvanometer was now connected to the hand electrodes only. After the necessary earthing process, I held the electrodes in the hands and obtained a deflection which remained steady at 170 mm. I then placed my feet, still in wet boots, on the brass tube and awaited results. The light on the scale very slowly began to recede towards zero. I repeated this experiment several times. The light never remained at zero, but if it got as far went over to the other side of the scale, and generally registered 40 to 60 mm. I take this as evidence that electricity was gradually leaking out of my body to earth, through my wet feet. One would not expect the light to register zero as there is continuous generation of electricity in the body. In view of these experiments, the grandmotherly advice we have so often received, not to stand about in wet boots, takes on a new and important significance which ought to claim our belated respect. They also to my mind afford evidence that trench foot is probably caused by long-continued leakage of electricity from the feet.

I noted that Dr. Leonard Hill had advocated rubber boots and greasing of the feet for the prevention of the disorder, recommendations with which I cordially agree. I sent to him in the spring a note about my own experiments, and

received from him a courteous letter thanking me for my "ingenious speculations," but countering me with the query "What about fishes, fishermen, and Channel swimmers?" When truth is really truth the most knock-out objections often end in being pillars in its support. Just as the vagaries of radium appeared to undermine the whole structure of physical science, and now form an additional proof that the foundations of that science have been well and truly laid, so Dr. Hill's objections assist my argument. For fishes are provided with a dielectric coat of mucus; I never heard of fishermen who had wet feet as long as the men in the trenches: and Channel swimmers always try to emulate the fish by rubbing themselves with a dielectric coat of oil. Their idea is to keep out the cold—it is really to keep in the electricity of their bodies; improved methods of accomplishing this result will at once suggest themselves to anyone acquainted with Baines's work.

The experience of officers at the front is that trench foot can be prevented. I am certain it can, but it can only be done, firstly, by keeping out the wet, and, secondly, by keeping up the electrical resistance of the skin of the feet. The feet should be thoroughly greased, and by far the best grease to use is the dielectric ointment which is now an article of commerce. It is interesting to note that our French colleagues are suggesting the use of ambrine for trench feet; they have had very good results with it in burns, but it is used empirically without appreciation of its dielectric action. I doubt if anything could improve on the results obtained by dielectric oil in cases of burns.

Rubber boots if worn for any length of time cause the feet to perspire too freely. White Robertson in the paper referred to above has shown that the soles of the feet and palms of the hands are parts which are designed to sweat freely and through which the normal escape of electricity to earth mostly takes place. The disadvantage of rubber boots is that owing to the excessive perspiration they cause the skin of the feet is liable to become sodden and so lose its electrical resistance. Soaking the boots, socks, and puttees in oil is the alternative I suggest for rubber boots. Any thick oil would do as a preventive; kitchen fat rendered with olive oil or cotton-seed oil might be tried, but I think that the skin of the feet should be rubbed with a dielectric grease. If signs of trench foot should develop in cases where these precautions have not been efficiently carried out, the best treatment is to wrap the foot and the whole of the lower part of the limb as far as the knee-joint in gamgee tissue soaked in dielectric oil. I have seen enough of this treatment to justify the assertion that no serious case of trench foot necessitating amputation need take place.

the right lung. Over the apex of the right lower lobe the signs were somewhat similar but less pronounced. The left lung seemed healthy. There were no cardiac murmurs and the urine was normal. His chief complaint was of the flitting pains across his chest, which were generally most severe at night. Cyanosis, first noticed in the lobules of his ears early in October, gradually spread to the face, while there was none of the extremities. With the deepening of the lividity there developed oedema. His lower eyelids became heavy with watery bullae and his neck swollen, measuring on the day of his death 17 inches at the level of the thyroid cartilage, while in health he wore a collar of 15½ inches. The external jugular veins stood out prominently. The superficial veins of the chest became distended, more markedly on the left side, and running along the left costal margin corresponding to the attachment of the diaphragm was a network of dilated venules. The superficial abdominal veins were not distended. There was no swelling of the arms or legs. The glands at the root of the neck and in the axilla were enlarged. The pupils were equal and so were the radial pulses. Towards the end he became very drowsy, even falling asleep during conversation. His breathing became stertorous and he died on Nov. 1st. A differential blood count made after the cyanosis became evident showed polynuclears 92 per cent., lymphocytes 3 per cent., and mononucleate (large) 5 per cent. The Arnett count gave a ratio of 46 to 54. The temperature was normal until the last few weeks, when there was a slight rise, but not beyond 99.4° F., with a small daily variation. At the post-mortem examination it was found that a large solid mass filled the superior and the posterior mediastinum. The pleura covering the right lung was firmly adherent. The upper lobe of the right lung was almost entirely invaded by tumour, and there was involvement of the upper portion of the lower lobe. The left lung and its pleura were healthy. Microscopically the tumour was seen to be a lympho-sarcoma. A section showed the growth destroying the wall of the superior vena cava and projecting into its lumen.

The case is of interest in showing the difficulties attendant on the making of a diagnosis of phthisis in the absence of tubercle bacilli from the sputum. The blood examination was helpful, although, unfortunately, a count was not made until the later stages of the illness. The high polynuclear count suggested an acute mixed infection if the case were really tuberculous, but the nearly normal temperature negatived such an infection. The Arnett count was practically normal, while, according to the findings of different observers, an active tuberculosis causes a definite deviation to the left.

For permission to publish this case I am indebted to Dr. C. F. Walker, medical superintendent of the Westmorland Sanatorium.

Grange-over-Sands.

## Clinical Notes:

### MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

#### A CASE OF SARCOMA OF THE MEDIASTINUM INVADING THE LUNG.

BY A. G. M. GRANT, M.D. EDIN., D.P.H.,  
FIRST ASSISTANT MEDICAL OFFICER, WESTMORLAND SANATORIUM,  
GRANGE-OVER-SANDS.

THE following case illustrates the points of resemblance between phthisis and malignant disease of the lung. On the admission of the patient to the sanatorium seven weeks before his death the clinical picture was in the main one of phthisis, but in the later stages the distinguishing features of thoracic tumour manifested themselves and suggested malignancy.

A man, aged 55 years, was admitted to the Westmorland Sanatorium on Sept. 13th, 1916, with a history of good health until the previous April when he first complained of radiating pain in the front of his chest, followed shortly afterwards by cough and expectoration, which compelled him to give up work in July. His sputum was copious and mucopurulent, of a yellowish brown colour, and well intermingled with blood. No T.B. were found. Examination showed deficient expansion, dullness, high-pitched breath sounds almost tubular in character, and increased vocal resonance over the upper lobe of

#### A CASE OF LARGE OMENTAL CYST IN A CHILD.

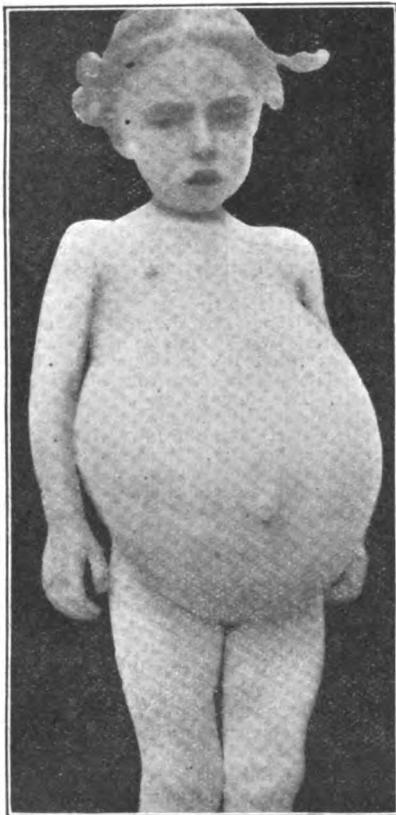
BY FREDERICK C. PYBUS, M.S. DURH., F.R.C.S. ENG.,  
SURGEON TO THE HOSPITAL FOR SICK CHILDREN; ASSISTANT  
SURGEON TO THE ROYAL VICTORIA INFIRMARY,  
NEWCASTLE-ON-TYNE.

OMENTAL cysts are sufficient rarities to warrant the publication of individual examples. The following notes are those of a patient in the Hospital for Sick Children, Newcastle-on-Tyne.

The patient, a girl, aged 4 years, was admitted to hospital in June, 1915, supposed to be suffering from tuberculous peritonitis. She was the only living child of a family of three, the mother having died of phthisis. It was noted that the child's abdomen had been swollen since she was 9 months old. She had been tapped on two occasions at the ages of 18 months and 2 years, but on each occasion the fluid gradually returned. After admission she was again tapped, six pints of fluid being removed. A few weeks later she developed scarlet fever and was transferred to the fever hospital. The photograph shows the condition of the abdomen at this period.

She was readmitted to the hospital in May, 1916. The circumference of the abdomen was 29½ inches. She was tapped twice shortly after admission, two pints being removed on each occasion. The fluid was of a slightly reddish colour and contained cholesterol crystals. I was then asked to see her by Dr. J. E. Dainty, who suggested that the condition might be a cyst and that abdominal exploration would be advisable. She was transferred to my ward and an operation was carried out in June, 1916. The

abdomen was opened above the umbilicus. A thin-walled cyst was found occupying the larger part of the abdomen. Three fine strands passed from the cyst to the abdominal wall, which I regarded as due to the previous aspirations. The cyst was tapped and drawn outside the abdomen. It was thin-walled, partially loculated, and situated in the great omentum. It was readily stripped from the omentum except at one part where the omentum was torn, and its upper part had to be peeled from the greater curvature of



Omental cyst in a girl of 4 years. Circumference of abdomen, 29½ inches.

the stomach. The omentum was repaired, completing the anterior wall of the lesser sac. The abdomen was then closed. The child made a perfect recovery and was discharged a fortnight later. The cyst was of the size of a large football. The exact quantity of fluid was not measured, but half-filled an ordinary pail. The cyst was occupied by a thin brownish fluid containing cholesterolin crystals and was partially divided into several loculi. Portions of the great omentum were removed with the cyst and remain adherent to its wall. Microscopic examination of its wall revealed no epithelial layer, so that it is difficult to account for its origin.

Newcastle-on-Tyne.

**DONATIONS AND BEQUESTS.**—The Chelsea Hospital for Women has received from the trustees of the Zunz Bequest £5000, being the balance of the £10,000 generously promised by the trustees towards the rebuilding of the hospital.—The trustees of the late Miss Marjory Shanks Schaw, of Glasgow, have given £60,000 to the Western Infirmary, £40,000 to the Victoria Infirmary, Glasgow, and £10,000 each to the Royal Samaritan Hospital for Women, the Royal Hospital for Sick Children, the Royal Maternity and Women's Hospital, and the Association for the Relief of Incurables, all Glasgow institutions.—The late Mr. John Sloughgrove, of Purliegh, has bequeathed £150 to the Essex County Hospital, £200 each to the Royal London Ophthalmic Hospital and the Reedham Asylum for Fatherless Children, £300 to Dr. Barnardo's Homes, and £250 each to the London Hospital and the Eastern Counties Asylum for Idiots.—The late Miss Isabella Mary Peploe-Smith, of Onslow-square, S.W., bequeathed £500 each to the Cancer Hospital, Brompton, the Consumption Hospital, Brompton, and the Society for the Prevention of Cruelty to Animals.

## Medical Societies.

### ROYAL SOCIETY OF MEDICINE.

#### SECTION OF HISTORY OF MEDICINE.

##### *Casanova's Mémoires.*

A MEETING of this section was held on Dec. 20th, 1916, Dr. NORMAN MOOKE, ex-President, being in the chair.

Dr. J. D. ROLLESTON read a paper on the Medical Interest of Casanova's *Mémoires*. He said that as a child Casanova appeared to have suffered from adenoids and small-pox. His sanguine temperament predisposed him to epistaxis, to which he was subject from childhood, and to piles, which he first developed during one of his imprisonments. From early adult life onwards he had attacks of fever, possibly malarial in origin, and at the age of 45 he had a severe attack of lobar pneumonia. He had numerous attacks of venereal disease—gonorrhœa and soft chancre, and possibly syphilis, as might have been expected from his own account of his life. He apparently sought medical advice on each occasion, and no sequelæ resulted. In old age he suffered from gout, and his death was probably due to septic absorption, secondary to enlargement of the prostate. Originally intended for the medical profession, Casanova retained throughout his life his interest in medicine, as is shown by his descriptions of disease, his criticism of doctors' dogmatic opinions on medical subjects, his successful simulation of various maladies, and his incursions into the field of therapeutics.

## Reviews and Notices of Books.

### *Diseases of the Umbilicus.*

By THOMAS S. CULLEN, M.B., Associate Professor of Gynaecology, Johns Hopkins University. With 269 illustrations. London and Philadelphia : W. B. Saunders Company. 1916. Pp. 665. Price 35s. net.

THIS volume contains a complete account of the various diseases affecting the umbilicus and the urachus. Not only has Dr. Cullen collected all that is known about these conditions, but he has also carefully recorded the more important cases, so that his work will be invaluable for reference to any future workers and serve as a foundation on which they may build.

It would seem hardly possible that so many pages could be needed to describe the diseases of so small an area of the body as the umbilicus. This book, however, deals not only very fully with all the known diseases of the navel, but also with such other matters as the omphalomesenteric duct and vessels, Meckel's diverticulum, and the urachus. The importance of the embryology of the umbilicus is very considerable because so many of the lesions are due to a partial or complete lack of closure of the omphalomesenteric duct or of the urachus. The section devoted to this subject is extremely clear and is illustrated by a very fine series of drawings by Max Brödel. The many interesting and instructive points which a detailed study of the anatomy reveals are well set out in Chapter II., and the four plates showing the different forms of the umbilicus will be a revelation to those who have never studied this region particularly. Umbilical infections and haemorrhage in the new-born child happily have lost the importance they once had, but an account of many of the old epidemics is given by the author and their relation to infections of the umbilical stump clearly shown. A large number of cases of the curious tumours formed by remnants of the omphalomesenteric duct, the so-called umbilical polyp, are collected and given in full, while the chapters dealing with a patent omphalomesenteric duct and prolapse of the bowel through such a duct are most interesting. As the author rightly points out, when a small umbilical polyp is noted after the cord has come away, the probable persistence of other portions of the omphalomesenteric duct, such as a Meckel's diverticulum or a cord from the mesentery to the umbilicus, must be remembered and the added possibility of intestinal obstruction developing later in life explained to the parents. It is interesting to find that most of the cases of so-called dermoids of the umbilicus turn out on further investigation

to be nothing more than inflammation due to the irritation of an umbilical concretion, the presence of caseous material and wool from the patient's clothing having led to an erroneous diagnosis in many of the cases. Records of cases of Paget's disease, diphtheria and syphilis of the umbilicus are given, and also numerous cases illustrative of the escape of intra- and extra-abdominal fluid, mostly pus, through the umbilicus as well as cases of umbilical fistulae. Among the most curious of all the conditions described is the series collected by Dr. Culley of umbilical tumours containing uterine mucosa or remnants of Müller's ducts, in reality adenomyomata of the umbilicus. It was a case of carcinoma of the umbilicus which first led the author to a study of the whole subject, and the chapter on that condition contains the records of many cases of both primary and secondary carcinoma of this region. These clinical histories show that the development of a small, hard umbilical nodule in a patient at or beyond middle age should at once raise suspicion as to the presence of some intra-abdominal malignant growth, and if there be symptoms suggestive of carcinoma of the stomach or gall-bladder the probability will become almost a certainty. Urachal anomalies, such as cysts, large and small, simple and infected, patency of the urachus and urinary fistulae, may give rise to a great deal of inconvenience and present clinical features often difficult of diagnosis. They are all, however, very fully described by the author, and a reference to this work should assist in clearing up many diagnostic puzzles of this nature.

The whole is a monument of industry and skill, and will form the most complete and important work on this subject for many years to come.

#### *Tratado de Pediatría.*

Por el Dr. MARTINEZ VARGAS. Tomo I., Fundamentos de la Pediatría. With 12 figures and 27 plates. Barcelona: J. Vives. Pp. xiv.-959.

Dr. Martinez Vargas, who is professor of paediatrics in the University of Barcelona, founder and President of the Spanish Paediatric Society and member of many learned societies, both Spanish and foreign, is to be warmly congratulated on this first volume of what, if the standard here set is maintained in the two further volumes promised, will be a really monumental contribution to the study of his subject, using the word in its widest and most comprehensive sense. Dr. Vargas connotes by paediatrics not merely the study of the diseases of children from the standpoints of pathology, diagnosis, and therapeutics, but also a fairly detailed consideration of the anatomy, physiology, hygiene, and vital statistics of infancy and childhood; he pays some attention to the history of paediatrics, its literature, and its development in civilised countries throughout the world.

In the first chapter, headed "General Considerations" (*Generalidades*), Dr. Vargas defines paediatrics as that department of medicine which takes for its subjects of study infancy and childhood in such of their aspects and relations as are of special interest to the physician. He goes on to discuss the limits of the subject and some of the special characteristics of infancy and childhood, their vulnerability to morbid influences on the one hand, their quick reaction and recovery on the other, the readiness with which anaemia comes on in any complaint tending to chronicity, the rapidity with which, in serious illnesses, exhaustion both supervenes and is recovered from, the influence of growth, and the preponderance of the lymphatic system. Next he deals with the anatomy of infancy and childhood, when the thymus gland, its anatomy and special functions are discussed fully. Then, after describing the special physiology of the new-born infant, he passes to a detailed consideration of the subject of infant feeding. This section is of especial value and is abreast of our present knowledge of the subject. Sections on dentition and growth complete the consideration of the special physiology of children, and the remainder of this section is devoted to digestion, respiration, and other functions common to the child and the adult. For the rest, the book deals systematically with the hygiene, pathology, and therapeutics of childhood.

The author's treatment of his subject is thorough and is characterised by a lucidity and sureness of touch which are the obvious fruit of wide knowledge and practical experience. The publisher is to be congratulated on the excellence of the plates and figures illustrating the work.

#### LIBRARY TABLE

*Infection and Immunity: A Text-book of Immunology and Serology for Students and Practitioners.* By CHARLES E. SIMON, B.A., M.D., Professor of Clinical Pathology at the College of Physicians and Surgeons, &c., Baltimore. Third edition, revised and enlarged. Illustrated. London: Baillière, Tindall, and Cox. 1916. Pp. 352. Price 14s. net.—Dr. Simon's practical and clearly written book has been brought up to date, and some new matter introduced. Abderhalden's protective ferments receive sufficient notice, and recent work on the Wassermann reaction has necessitated the re-writing of this section. Allusion is briefly made to more speculative work, such as the avoidance of anaphylactic shock by the production of anti-anaphylaxis, and the recognition of protection against diphtheria toxin by an allergic reaction. The treatment of the whole subject gains greatly in interest in this way. Dr. Simon primarily conceived his book for the enlightenment of the general practitioner. In its present form he believes that it may serve as a basis for a course of systematic instruction, and in this we agree with him.

*The Charaka Club.* Vol. IV. New York: William Wood and Co. 1916.—The fourth volume of the proceedings of the Charaka Club has much the same character as that of its predecessors, to which we have already made reference in these columns. The members of the club number some of the most prominent medical men who are practising or who have practised their profession in the United States; its object is to read papers and to promote discussion upon medico-historical subjects. There is no doubt that the interest of medical men in literary and artistic matters bearing on medicine has steadily increased of late, and to this agreeable fact it is quite likely that the publications of the Charaka Club have contributed, for the first two volumes are now out of print, and their messages must have been widely disseminated, though the membership of the club is small. The most important article in the present volume is a learned and fully illustrated dissertation upon Saint Cosmo and Saint Damien, the patron-saints of surgeons, apothecaries, and barbers, whose presentations confront us so frequently in the picture-galleries of Venice and Florence. Other interesting papers are one by Dr. Collins on the literary leanings of the physicians of the eighteenth century and one entitled "The Development of Anatomical Illustrations of the Nervous System," by Dr. C. L. Dana. Vesalius stands out among all the early illustrators of neurology for his knowledge and accuracy, but the diagrams made practically at the same time—i.e., 1545—by Charles Estienne (Stephanus) are wonderfully good, judging by the examples furnished by Dr. Dana. A sad history attaches to a sketch of the history of the University of Alexandria, as the author, Dr. J. G. Mumford, died just before its publication. A biographical note on Antonio Scarpa is supplied by Dr. A. G. Gerster. Dr. Pearce Bailey sends a short story of some medico-psychological interest, and the Bacon and Shakespeare controversy is reviewed from the botanical aspect by Dr. G. L. Walton.

*The Care of the School Child.* Edited by JAMES KERR, M.A., M.D.Cantab. London: The National League for Physical Education and Improvement. 1916. Pp. 230. Price 2s. 6d.—Bishop Boyd Carpenter introduces the reader to an admirable series of popular monographs, each by an expert, reprinted from lectures delivered under the auspices of the National League for Physical Education and Improvement during the summer months of 1916. The lectures are popular in the best sense; they may readily be understood by anyone who cares to read them with attention, but they contain the most recent knowledge on the subject in hand and the proper deductions from this knowledge. The chapters on malnutrition and the cripple child seem to us specially helpful. The book will be read with advantage by parents, teachers, nurses, health visitors, medical students, and even practitioners.

*Human Temperaments.* By CHARLES MERCIER, M.D. Lond., F.R.C.P.Lond. London: The Scientific Press, Limited. Pp. 91. Price 1s. net.—Dr. Mercier in this small book sets out the description of ten well-known types of character drawn from his personal study of men and women. He begins by amusing and adroit chapters defining temperament generally, cleverness, and capability, and proceeds to describe the artistic, religious, envious, jealous, and suspicious temperaments, the man of action the practical man, the man of

fads, the man of business, and the philosopher. The essays are written in Dr. Mercier's well-known style—they are witty, pithy, and dogmatic, and display a wide range of observation and learning. Thinking people must endorse a great many of Dr. Mercier's generalisations—a statement which is likely to tempt Dr. Mercier to modify them; but no one who presumes to have opinions of his own, and who possesses any experience with which to back them, is likely to agree completely with him, so that opportunities for battle are provided. We recommend the brochure cordially to our readers. It is always extremely readable and often very wise.

*Wheels: An Anthology of Verse.* Oxford: B. H. Blackwell. Pp. 84. Price 2s. 6d. net.—We are not often asked to express an opinion upon verse, and, when we are, the object of the writer has generally been the illustration by social incidents or pathological phenomena of some medical doctrine or moral. Such volumes are almost invariably failures, dull when they are serious and unspeakably so when they are in jocose vein. "Wheels" has no medical aspects whatever, save the unconscious revelation by the authors that the psychology of the cultivated youth of to-day finds ready and graceful expression in verse—where their fathers wrote short stories and their grandfathers long essays, they sing. The camps and the trenches during the past two years have produced many copies of verses having claim to notice as beautiful poetry, and "Wheels," though little of its contents may have been written in the circumstances of war, has an origin similar to that of the rapidly increasing war anthology. It is composed, speaking for its common and essential quality, of impressions suddenly seized and handed on by writers who are conscious of what has been suggested to themselves and who are determined to share the suggestion with others. The idea of these young poets is that the rôle of poetry is rather to crystallise fleeting views and aspects, to catch and fix vague and half-formed ideas, than to do any of the brave things associated in popular literature with the title of poet—to lead, to uplift, to amaze. The inspiration of these nine different writers—different in style, technique, and standard of accomplishment—has been a common one. They strive to show that any impression received by one person should be communicable to others by the medium of symbolic word-pictures; and, says the preface,

Our words are turned to spokes that thoughts may roll  
And form a jangling chain around the world  
(Itself a fabulous wheel controlled by Time  
Over the slow incline of centuries).

We recommend the book to lovers of verse, leaving them to decide which spoke of the wheel they prefer, and to guess which individual singer is most likely in the future to gain a large audience or make a stronger individual effort. The contributors are Edith, Osbert and Sacheverell Sitwell, E. Wyndham Tennant, Arnold James, Victor Perowne, Nancy Cunard, Helen Rootham, and Iris Tree.

*Poland's Case for Independence: A Series of Essays illustrating the Continuance of Her National Life.* London: George Allen and Unwin, Limited. Pp. 352. Price 7s. 6d. net.—The essays which make up this book have been supplied by the Polish National Committee and have been written to prove that the national life of Poland has never ceased to exist, despite the brutal fate which has been meted out to the country by the militarism of more powerful States. The book interprets the manifestation of that life to foreigners, and especially to the people of Great Britain, who have been persistently friendly to the Poles, and in our opinion the claim of the writers is made entirely good that a country which has manifested such indestructible vitality has a right to the independence she claims. The essays comprise one by Dr. R. W. Seaton Watson on the landmarks of Polish history and another by Mr. Rajmund Kucharski describing the persistent struggle for independence. Mr. Arthur E. Gurney contributes usefully on the population question, showing what were the extensive territories which up to 1772 constituted the Commonwealth of Poland and what were the nationalities of the various inhabitants. This chapter appropriately precedes an essay by Mr. Stanislaw Posner upon Poland as an independent economic unit; and the book closes with sketches of the history of intellectual Poland, its literature, art, and music. From the outset of the war it has been felt that the settlement of Poland will form a question of the utmost importance, and one whose adjustment requires a sympathetic knowledge of Polish affairs such as is here shown.

#### JOURNALS.

*Annals of Tropical Medicine and Parasitology,* Vol. X., No. 1.—This number of the annals contains four articles, three of which are contributed by Dr. J. W. Scott Macfie, of the West African Medical Staff, and pathologist to the colony of the Gold Coast, the fourth being furnished by Professor J. W. W. Stephens, of the University of Liverpool. Dr. Scott Macfie's first paper describes a fourth variety of trichonocardiasis affecting the shafts of the hairs in the axilla and groin, and caused by *Nocardia tenuis*, either alone or associated with a chromogenic organism. His second contribution is entitled "Observations on Urinary Amoebiasis," and in this he makes reference to three cases which were recently investigated in the Gold Coast, the infection in these instances, as well as in the few others already reported by previous observers, being due to *Entamoeba histolytica*. Urinary amoebiasis, it appears, may be due to a primary infection, or it may be secondary to amoebic dysentery. Cystitis, tumour of the bladder, and gonorrhœa are said to be predisposing causes. Dr. Scott Macfie's third contribution deals with the morphology of certain spirochaetes of man and other animals, and is illustrated by a number of drawings in the text. He describes a spirochæte which was found in the discharge from a mild case of vaginitis in a native woman, this organism being regarded as the causal agent of the disease. Another spirochæte was discovered inhabiting the bladder of a male patient suffering from chronic cystitis; while a third variety of spirochæte was found in the throat of a native affected by pharyngitis. Included in this paper are some interesting observations on the intestinal spirochaetes of certain of the lower animals, including the monkey, rat, sheep, cattle, goat and pig, in the faeces of which spirochaetes of the *S. eurygyrata* type were discovered. Professor Stephens's paper is a continuation of his previous "Studies in Black-water Fever," and in it he urges the importance of population statistics being supplied in connexion with reported cases of this disease. He points out that it is high time that the disputed questions regarding this malady were settled, and that systematic attempts should be made to obtain detailed information from official and other sources in localities affected by blackwater fever. The incompleteness of the statements sent by some observers often rendered their contributions entirely valueless. For the assistance and guidance of those who may in future compile local statistics of this disease, Professor Stephens puts forward several forms which can be filled up, giving all the information that is needed.

*British Journal of Ophthalmology.*—The appearance of the first number of this journal, the title-page of which is the epitaph of the Royal London Ophthalmic Hospital Reports, the *Ophthalmic Review*, and the *Ophthalmoscope*, marks the beginning of a new era in the literature of British ophthalmology. The journal is in the enviable position of being without a rival, a position which is not free from danger. Judging, however, by the first number and by the imposing list of names of the editorial committee, which includes ophthalmologists of all parts of the Empire, there would seem to be little fear of the journal succumbing from lack of driving power. The editor, Mr. Sydney Stephenson, founded the *Ophthalmoscope* and by his zeal and skill made it a great success. His long experience is a most valuable asset, and he is ably seconded by the assistant editor of the *Ophthalmic Review*, Mr. Erskine Henderson. After a few remarks on the origin of the journal, and the expression of a cordial welcome by American colleagues, the Nestor of English ophthalmology, Mr. Priestley Smith, leads off with a highly scientific communication on the Blood Pressure in the Eye and its Relation to the Chamber Pressure. We consider it a good omen that original research is thus early and emphatically recognised, and that the second place should be given to pathology in a paper on Choroidal Melanomata by Mr. Foster Moore. Then follow three papers on the removal of foreign bodies by the magnet, the most important of which, by Mr. M. H. Whiting and Mr. C. Goulden, records the experiences and lessons of war work in France. In the abstracts from ophthalmic literature the excellent method of collecting several papers on allied subjects for review is adopted. Book notices and notes on matters of current interest conclude the number. Of the 74 pages, 42 are devoted to original communications. The paper, printing, and numerous illustrations are all excellent. We wish our new contemporary every success.

# THE LANCET.

LONDON: SATURDAY, JANUARY 13, 1917.

## Preventive Treatment in Relation to Venereal Disease.

IN every infectious complaint there is a stage between infection and the appearance of evidence of disease, that symptomless incubation period which is still full of mystery in spite of our increasing knowledge of the life-history of disease germs. This period should logically be the most favourable time for treating disease or—if exception be taken to the word treatment in this connexion—for the preventive treatment of disease, reserving the word prevention for the avoidance of infection. Regarding the incubation period, then, as an ideal time for the application of measures of preventive treatment, the field of such treatment becomes a vast one if we only are aware in every case when infection actually takes place. In most instances, however, exposure to infection passes entirely unnoticed, or if noticed the chances of escape are so great, and the risk from disease itself so small, as to lead most people to neglect treatment even if available. Only in the case of dangerous and awe-inspiring plagues, such as small-pox and tetanus, is the demand for preventive treatment on the part of those who have been exposed to infection an urgent one, and it is well known how successful is the immediate vaccination or revaccination of small-pox contacts and the preventive inoculation with tetanus antitoxin of the victims of grievous wounds.

There is, however, a special case for preventive treatment. The possibility of infection with venereal disease must be present to the minds of all, excepting the most carelessly ignorant, of those who indulge in promiscuous sexual intercourse. A definite occasion for infection has been present which cannot be overlooked, and Sir BRYAN DONKIN's letter to the *Times* last week calls attention to the fact that it would be a fresh safeguard to the community as well as to the individual to antedate the treatment for venereal disease to the period of incubation, before the symptoms have had time to appear. Scientific research has, he says, shown conclusively that venereal infection can be prevented more surely than it can be cured by even the best methods of prompt treatment, and this fact was securely established by the precise experiments of the late Professor METCHNIKOFF. Sir BRYAN DONKIN's allusion is to the method of inunction of a calomel ointment as soon as possible after exposure to infection, described by METCHNIKOFF in his Harben lectures delivered in London ten years ago and translated from the French in our columns at the time. How far progress has been made since then is witnessed by the fact that in military administration, directed to the only organised group of society in which, before the awakening of to-day, measures had been adopted to deal with venereal

diseases, this inunction has already become a routine measure. An Army Order issued in March of last year directed medical officers to arrange an organised system by which soldiers who had exposed themselves to the danger of venereal infection were required to attend for treatment within 24 hours of infection. Men returning to barracks at any hour of the day or night were to have access to a room in the charge of an orderly who should superintend an efficient urethral irrigation with permanganate solution and an inunction into the glans penis of calomel ointment (calomel 33 parts, lanolin 100, vaseline 10). We understand that in the case of one battalion of 1700 men in which these facilities for preventive treatment were introduced the incidence of venereal disease immediately fell to less than a quarter of its previous figure.

The value of early preventive treatment, then, in the case of venereal disease is as well established as it is for small-pox and tetanus, and its wide application is equally indicated in the interests of individual and public health. Early preventive treatment must take its natural place in any well-considered scheme for control of venereal disease. It may well be that provision for the use of civilians of the facilities already provided for soldiers would result in a similar limitation of disease, and thus of the necessity for prolonged treatment. We are only concerned now to consider in any detail the medical aspect of the question, believing, as we do, that here as elsewhere physical and moral hygiene go hand in hand, and that it is impossible to develop one at the expense of the other. It has now come to be generally accepted that the provision of early and effective treatment of the diseases acquired by promiscuous sexual intercourse is not going to increase the incidence owing to the removal of moral restraint; but the idea of a Mikado-deity who must not be thwarted in his schemes for making the punishment fit the crime has died very reluctantly. The same mediæval doctrine has been applied during the lifetime of most of us to the treatment of the later stages and of the sequelæ of syphilis and gonorrhœa. Not only did some of our medical charities refuse, with the countenance of the regulations under which they were founded, to assist the victims of venereal disease, as far as they were able to diagnose such victims, but even the medical schemes organised by the public for mutual medical benefit—medical aid associations and sick clubs— withheld treatment from venereal sufferers. We have changed all that, and to-day the municipal schemes for the control of venereal diseases concern themselves keenly with the treatment of the earlier stages of those diseases. The application of the same doctrine to early preventive treatment is a logical step forward, and ought to be taken at once.

## Mobilisation of the Medical Profession.

THE subject of the mobilisation of the medical profession came before a special meeting of the Panel Committee for the County of London on

Tuesday last, when a report submitted by the Finance and General Purposes Subcommittee was considered in detail. The report recognised the urgent necessity of providing additional officers for the Royal Army Medical Corps, its authors being convinced by confidential information which had been submitted to them that a large number of additional practitioners would be required for military service.

The very important resolution recently passed by the Central Medical War Committee with regard to mobilisation approved, it may be recollect, of the principle of mobilisation of the medical profession apart from any question of general mobilisation of the community. For the Central Medical War Committee desire that every individual whose name is on the Medical Register shall be held bound to give such service as he is competent to give when required to do so by the State. On this broad question of the mobilisation of the medical profession as an individual entity the Panel Committee for the County of London have made no pronouncement, but they consider that if such a proposal were carried into effect it is essential that the arrangements for mobilisation should be under the control of a purely professional committee. They find that the Central Medical War Committee, strengthened in certain directions, would be the most suitable body to undertake the important work. The recommendations of the Panel Committee provide accordingly for the addition to the Central Medical War Committee of "at least six practitioners actively engaged in panel practice, one of whom should be a woman," and they consider, further, that without serious interference with the medical needs of the civilian population much greater use could be made in the future of the part-time services of civilian doctors. Civilian doctors could, they hold, be advantageously employed in the treatment of sick and wounded soldiers whilst in hospitals, as well as for the discharge of other military duties at home. We are certain that the members of the Panel Committee for the County of London are well aware of the difficulties attached to this proposal, but it is the expression of a very general feeling, and one which we share ourselves. We believe that in this way an economy of personnel could be effected and more medical men found to meet the demands of the Director-General of the Army Medical Service.

We regret the recommendation of the Panel Committee that the members whom they desire to see added to the Central Medical War Committee should necessarily be engaged in panel practice. The probability, of course, is that those selected for the purpose would be in active panel practice, but it is perilous to attach conditions which might become hampering. The views of those in panel practice can be fairly stated by anyone really familiar with the circumstances, and it is conceivable that panel practitioners might by restricting their representation to one of themselves be deprived of the offices of a particularly good nominee.

## Annotations.

"*Ne quid nimis.*"

### HEALTH OF THE PRISON POPULATION.

Few people regard the prison as a health resort, but the contention that such is the case in prisons in this country would be made plausible by a perusal of the report of the Commissioners of Prisons which we publish in another column. The average death-rate in local prisons for the last 25 years has been less than 0·5 per 1000 receptions, and although for the year under review it is nearly 50 per cent. greater, the increase is entirely explainable by the altered age groups of the prison population. Prisoners of military age naturally are healthier and contribute less to the prison death-rate than do the older malefactors, and the actual number of prisoners of military age received in prisons has diminished to less than one-third in the last three years and entirely out of proportion to the reduction in older prisoners. The death-rate from natural causes in convict prisons is, of course, much higher: 6 per 1000 of the daily average population during the last ten years and 8 per 1000 for the year under review. No emphasis can here be laid on slight fluctuations as the total convict population is so small—under 2000, in fact, at the end of the year. No epidemic of infectious disease occurred during the year, and only 13 scattered cases in all; 3 each of enteric fever and erysipelas, the remainder being ordinary infectious fevers of a mild type. A comparative picture of prison life under less healthy conditions may be gained from Lieutenant-Colonel W. J. Buchanan's report for 1915 on the jails of the Bengal Presidency which has just come into our hands, and the comparison is not an unfair one in respect of numbers as the daily average number of prisoners is not widely different: 11,311 under the care of the English Commissioners, and 14,494 in Bengal, bearing in mind, however, that of the first number only about one-fifth are convicts, while of the Bengalese 97 per cent. are convicts. There is the initial striking fact that the death-rate amongst the Bengal convicts during 1915 was over 20 per 1000, being nearly three times the rate among convicts in the prisons of England and Wales. Of the 264 deaths among Bengal convicts in 1915, 77 were due to dysentery, 24 to malaria, 18 to diarrhoea, in addition to 38 from tuberculosis and 26 from pneumonia. Lieutenant-Colonel Buchanan, whilst attributing this melancholy death-rate largely to the very serious overcrowding in the prisons, remarks that in the district jail of Barisal the persistent care and attention given by the medical officers has resulted in practically stamping out dysentery from this jail, but he goes on to record the very serious mortality in Dinajpur which blots the year's administration. In this jail of 315 inmates there is a daily average sickness of 29 and a death-rate of 119 per 1000, 18 deaths during the year being due to dysentery, 2 to malaria, 4 to pneumonia, and 2 to diarrhoea. In regard to this jail Lieutenant-Colonel Buchanan writes: "I have urgently pressed on Government the great need of a hospital here. This jail is one of the worst of the East Bengal jails, and the medical officer has not a fair chance in treating the sick drawn from an unhealthy district in the present old barrack wards used as a hospital."

The standard of mental health of the prison population is not a high one for a variety of reasons. The English Prison Commissioners report the number of persons in local prisons found to be insane after reception as 103 (126) and in convict prisons 36 (26), the numbers in brackets being those for the previous year. Of the cases certified in local prisons three-fourths were regarded as already insane on reception and another 7 showed symptoms of insanity within a month of reception. The war has had a remarkable effect upon the prison mental standard on account of the absence, already noted, from the prisons of strong able-bodied men. The Commissioners record their belief that the country's call for men has appealed as strongly to the criminal as to other classes, and it is a remarkable fact that receptions to prison are now principally confined to the mentally as well as physically weak. The Commissioners express their regret at the paralysing influence which the deficiency of State accommodation has exerted on the treatment of criminal defectives, but they look forward to the cessation of hostilities rendering possible an efficient administration of the Mental Deficiency Act. The present method of dealing with the confirmed and hopeless inebriate also comes up again for censure.

#### THE PIG AS A FOOD MIDDLEMAN.

THE Local Government Board and the Board of Agriculture and Fisheries are concerning themselves with the necessity for increasing the food productions of the country by the development of pig, poultry, and rabbit breeding. In regard to the two latter, few hygienic or dietetic problems arise. But the recommendation to increase the number of pigs, and that not only in rural districts, where space is abundant and neighbours are distant, raises very different questions. The hygienic aspect is at once apparent, and has led to the existence in a number of urban districts, as well as in a few rural ones, of by-laws prohibiting the keeping of pigs within a prescribed distance of dwelling-houses. We learn, however, from a recent circular of the Local Government Board that a regulation is about to be made enabling any local authority to give permission for the keeping of pigs either generally or in particular cases, notwithstanding by-laws to the contrary. To those acquainted with the habits of the pig under favourable surroundings this relaxation will not appear unreasonable. The pigsty often smells not because of the pig, but because of the ignorance of his keeper. Provided with a small area for the purpose the pig will dispose of his excreta without any nuisance whatever and with incidental enrichment of the soil, while his sty remains cleanly. It is the wholly confined pig who stinks. But on the dietetic side, in recommending pig culture as an economical pastime the fact must not be lost sight of that the alimentary canal of the pig is adapted for much the same kind of food as the human child's. The pig has no highly developed cæcum to deal with the conversion of cellulose into digestible carbohydrates. The growing pig is a typical omnivore and ordinarily receives a large amount of nutritive material, some of which the growing child could well digest. Experiments have shown that via the pig as middleman only some 25 per cent. of the protein and some 45 per cent. of the total energy value of the food supplied him is

ultimately returned to the consumer as pork or bacon. Brokerage of at least 55 per cent., which may well be largely exceeded, is charged by the pig. Pig culture can afford no excuse for wasteful housekeeping, and the presence in the pig-bucket of food which the family could have consumed is a disgrace to any patriotic housekeeper. The inspection of the amount of household waste might well become part of the sanitary inspector's routine duties at the present time. The case for pig keeping is more cogent where food refuse from hotels and institutions is in question. Food waste is apparently inseparable from civilised town life, and the pig may well be employed to redeem some of this waste if proper care is given to his lodging.

#### THE INTERNAL FORM OF HODGKIN'S DISEASE.

IN the *Journal of the Royal Army Medical Corps* Lieutenant T. H. Whittington has reported a case of the "internal" form of Hodgkin's disease of acute onset with relapsing pyrexia and signs and symptoms chiefly abdominal, which was very difficult of diagnosis and deceived the "very elect." A private, aged 19 years, was admitted to a base hospital from the trenches in Flanders on Nov. 21st, 1915. He looked pale and complained of pains in the soles, but nothing abnormal was seen in the feet. On the 24th the abdomen was distended, slightly tender all over, and rather rigid. The temperature ranged from 103° to 104° F.; the tongue was dry and brown. A leucocyte count showed a leucopenia of 3500. On the 27th he was sent to a hospital for infectious diseases as probably a case of enteric fever, and came under Lieutenant Whittington's care. He was very pale, with a rather "renal" appearance, and complained of headache. There was occasional muttering delirium with picking at the bedclothes. The pulse was very soft and occasionally dicrotic. There was marked tenderness with dullness on percussion in the left hypochondrium and left lumbar regions. This dullness appeared to be splenic, reaching down four finger-breadths below the umbilicus, but the spleen was not felt. The stools were fluid and yellow. No enlarged glands were felt. The serum reactions for the typhoid and paratyphoid bacilli were negative. The diagnoses so far suggested were acute peritonitis, recurrent appendicitis, and typhoid fever, the last being favoured. During the next week the abdominal distension diminished, enabling a firm and slightly tender spleen to be felt. The haemoglobin was only 52 per cent. From Dec. 2nd to 5th the temperature fell and the patient rapidly improved. On the 31st he again became listless and pale, and complained of pains in the soles and toes. The temperature again rose and the spleen rapidly enlarged. The temperature soon fell, only to rise again on Jan. 4th, 1916, when the spleen was still more enlarged and the liver slightly so. Blood examination showed 3000 white and 3,600,000 red cells per c.m.m. A differential count gave polymorphonuclears 80 per cent., lymphocytes 15, and large mononuclears 5. Several consultants saw the patient, and the diagnoses suggested were: a typhoid relapse, splenic anaemia, and tuberculous peritonitis, but Hodgkin's disease, Malta fever, kala-azar, congenital syphilis, and septicaemia were also discussed. He again improved, but another relapse followed, the abdomen being distended and showing free fluid in the flanks. There appeared to be an indefinite mass above the umbilicus. He became very emaciated and jaundiced,

and died on Feb. 15th, 12 weeks after the onset. At the necropsy much yellowish fluid was found in the abdomen. The spleen was thrice the normal size and hard and showed on its surface and on section yellowish-white spots. An enlarged gland in the portal fissure seemed to press on the hepatic duct. The retroperitoneal glands formed a large, irregularly lobulated, hard mass. Some enlarged glands were found below and behind the inner ends of the clavicles. Microscopic examination showed the typical appearance of Hodgkin's disease. In McNalty's study of "Lymphadenoma with Relapsing Pyrexia,"<sup>1</sup> 8 cases out of 32 are described as without enlargement of the superficial glands. In only 2 of these was the duration shorter than in the present case. In a man, aged 23 years, the mediastinal glands, spleen, liver, and kidneys were affected and he died after five weeks. In the other the mesenteric and bronchial glands, liver, and spleen were affected, and death occurred after seven weeks. The other patients lived for periods varying from 4 to 15 months.

#### THE PARLIAMENTARY REPRESENTATION OF DUBLIN UNIVERSITY.

WE published last week a letter from the Professor of Anatomy and the Professor of the Practice of Medicine in Dublin University, urging upon those of our readers who are entitled to vote for the Parliamentary representation of the University to record their support at the forthcoming election in favour of Sir Robert Woods, M.D. Dub., who is standing as a non-party candidate. Sir Robert Woods approaches the electors with the plea that he is the representative of the medical faculty of the University, which is notoriously one of the most distinguished faculties, while Mr. Arthur W. Samuels belongs to the profession of law which, except in one solitary instance, has for half a century supplied the constituency with its Parliamentary member. The issue, in fact, is one to be decided between the profession of medicine and the profession of law, for both candidates disclaim party views in politics. Mr. Samuels describes himself as "a Unionist and Imperialist," with no reference to party interests. Sir Robert Woods is equally detached. In answer to a correspondent he has written: "I shall resist with all my power any attempt to revive the Irish controversy during the period of the war ..... and to coerce any section of the Irish people into a settlement which it does not desire. If, however, with the full and free consent of the Unionists of Ulster and the Unionist minority of Dublin and the South of Ireland, and with the full sanction of the Imperial Parliament, a real settlement of the Irish question is evolved, after the war, by the united statesmanship of both countries, I shall do my best to help it in every way." We wish Sir Robert Woods every success, because it is constantly brought home to us that the presence of more medical men in the House of Commons would be of great value to the country. The ignorance displayed by the majority of Members of Parliament upon all medical points is illustrated by the nature of the questions in the House of Commons no less than by the way in which medical, and indeed all scientific, interests are too often sacrificed to the interests of other sections of the community. At the Conference of Educational Associations held at the University of London last week Sir Alfred Keogh said it was a regrettable thing to find Cabinet Ministers,

prominent administrators, and other people in high positions having no knowledge whatever of the elementary facts of science. He had to place scientific questions before these men, and he found it difficult to get low enough to reach their level. Every medical Member of Parliament helps to improve the situation, and from this point of view alone Sir Robert Woods may fairly expect votes.

#### OSTEOCHONDROMATOSIS OF JOINT CAPSULES.

IN 1900 Reichel published the first description of a rare condition characterised by the appearance of multiple osteochondromas in the capsules of one or more of the joints. Dr. J. W. Kopp<sup>1</sup> has recently recorded three new instances of this complaint, affecting the knee-joints in each patient, and he has found 11 others in medical literature. In 10 of the total of 14 patients the knees were involved; the ankle, wrist, elbow, hip, and metacarpophalangeal joint of the middle finger have also been found affected, each in different cases. In three patients, including one of Dr. Kopp's, both knee-joints were diseased; otherwise the osteochondromatosis has apparently been confined to a single articulation. The disease may occur at any age, and although the new growths show no sign of malignancy they may recur after their operative removal, by arthrectomy or resection of the joint, has been attempted. This, no doubt, is a consequence of incomplete removal. In Reichel's case the patient was a man of 36 with a very chronic and almost painless affection of the knee. The joint was opened and a quantity of blood was removed from its cavity, together with two handfuls of loose cartilaginous fragments. Recovery followed; shortly afterwards Reichel opened the joint again and removed a number of loose, bluish-white cartilaginous fragments, but an attempt to dissect out the whole capsule of the joint, which was beset with numerous cartilaginous nodules of various sizes, was baffled by the discovery of similar nodules on the cruciate ligaments. Resection showed that the articular surfaces of the femur, tibia, and patella were unaffected, and that the new growths originated in the capsule of the joint. Dr. Kopp's first patient was a healthy student, aged 24, who came under observation in 1911 with a history of slight pains in the right knee for four years. The condition was attributed to trauma of an unusual character to which the attention of neurologists may be drawn—percussion of the patella with a percussor in a wanton moment during a joyous evening. The patient's gait was normal, but there were symptoms of the nipping of a foreign body in the joint. The joint itself showed an unsymmetrical swelling of the synovial membrane and the suprapatellar bursa, with fluctuation and limitation of movement to about 75°. Numerous free foreign bodies could be felt in it, and one, the size of a grape, lying on the inner side of the patella, could be moved two inches in any direction, but always returned to the same place, whence it was concluded that it had a peduncle. All the other joints seemed normal. This patient had had comparatively little trouble with his knee when he was seen again in 1914, and he refused operation; skiagrams were taken and are reproduced by Dr. Kopp in his paper. They show a curious dappling of most of the area subtended by the synovial membrane, but no changes in the structure of the bone or their articular surfaces. Dr. Kopp's second patient, a man of 39, gave a history of slight

<sup>1</sup> Quarterly Journal of Medicine, October, 1911.

<sup>1</sup> Nederl. Tijdschr. v. Geneeskunde, Amsterdam, 1916, II., 1175.

trauma of the knee some 15 years before. Three years later he had had symptoms pointing to the nipping of a loose body in the joint. Dr. Kopp found swelling of the joint and suprapatellar bursa, and in both could be felt some movable and hard foreign bodies. The joint was opened under ether anaesthesia, and an incomplete arthrectomy was performed. Two free foreign bodies were found in the prepatellar bursa. The outer surface of the synovial membrane was found to be studded with bluish-white opalescent nodules, the largest as big as a pea. There was no evidence of inflammation and the synovial fluid was clear. Careful examination showed that these nodules arose from the synovial membrane only, and not from bone, cartilage, ligament, or muscle. The ends of the bones exhibited the appearances of arthritis deformans in its early stages. The patient made a good recovery from the operation, and was well satisfied with its results when he was seen again 20 months later. But a couple of foreign bodies could then be felt in the immediate vicinity of the right knee-joint, and Dr. Kopp concludes that it also was becoming affected with osteochondromatosis. The third patient was an old woman of 77 with senile dementia, who had foreign bodies in both knee-joints. Operation was not contemplated, but Dr. Kopp decided from the physical signs and skiagrams that he had here to do with a third case of this rare disease. Discussing its general diagnosis, he says that it has to be distinguished from osteoarthritis localised in some diverticulum of the joint, from the intra-articular exostosis cartilaginea first described by Volkmann in 1855, from arthritis deformans, and from the osteoarthropathies met with in tabes dorsalis and syringomyelia. As another possible source of confusion he mentions the fabella, a sesamoid bone appearing not rarely in the external head of the gastrocnemius. The pathogenesis of osteochondromatosis is uncertain. Reichel attributed it to infection; Lexer (1907) refers it to a developmental defect in the differentiation of the mesenchyma of the joint, comparable to that resulting in the growth of enchondromas about the bones of the fingers and toes. Dr. Kopp agrees with Lexer. The neoplasms removed from his second case were examined for him by Dr. de Josselin de Jong, who states that in this instance the nodules began life as minute osteomas in the capsule of the joint, and ended up as foreign bodies free in the joint, where they became covered with connective tissue and cartilage, while their bony core might develop into a calcareous mass. As for the treatment indicated, Dr. Kopp believes that recurrence is likely to follow arthrectomy or excision of the capsule of the joint, and that nothing short of resection of the whole joint will give a permanent cure.

#### SANITATION AND DISEASE IN BENGAL.

THE work of combating disease in India is rendered difficult by the indifference of the people to elementary hygienic precautions. The annual report for 1915 recently issued by the Sanitary Commissioner of Bengal illustrates this fact in a striking manner. The ravages of cholera in the Presidency during the year were very great, the number of deaths due to that disease being over 130,000, an increase of 41,000 on the total of 1914. The districts which suffered most severely were Mymensingh and Malda, and the high rate recorded is explained by the action of the people themselves. Dealing with Mymensingh, the civil surgeon writes: "In August, when a large part of the district was

under water, dead bodies of cholera patients were, in two subdivisions of the district, thrown into the flood water, which spread the disease far and wide till the end of the year. These two subdivisions were responsible for 18,819 deaths out of a total of 26,662 in the whole district." This record is supplemented by the account given by the civil surgeon of what occurred in Malda. "From some of the bordering villages dead bodies were thrown into the river, and this contaminated the water and facilitated the spread of the disease to the villages situated on it." It is not surprising, in view of the facts we have cited, that the Sanitary Commissioner should declare that outbreaks of cholera must be counted as annual events so long as the majority of the sources of water-supply remain subject to gross contamination. But even where waterworks are installed and a pure supply is forthcoming the advantages thus afforded are not universally appreciated. Thus, at Berhampore, which has been provided with a pipe-supply, certain classes of the inhabitants persisted in drinking unfiltered water brought from the river, with the result that 74 deaths from cholera took place among them last year, while those who availed themselves of pipe-water remained immune to the disease. Bengal occupies the unhappy position of being the only part of India where the death-rate exceeded the birth-rate in 1915. The increase in mortality was largely due to cholera and small-pox, while the diminution in the birth-rate is ascribed to the deficiency in rainfall in 1914, which by preventing a decline in the prices of food grains affected the vitality of the poorer classes. The Government resolution on the Sanitary Commissioner's report expresses the opinion that the best prospect of permanent improvement in village sanitation lies in the widespread formation of union committees and the free exercise of their powers of local taxation. The Governor agrees with the Commissioner that much immediate improvement, which would also have an educative value, could be attained through the personal interest and initiative of district officials.

THE death is announced, at the age of 90, of Jean Baptiste Auguste Chauveau, professor of comparative pathology in the Paris Natural History Museum, and one of the most famous physiologists of his time.

A MEETING of the British Hospitals Association will be held at St. Bartholomew's Hospital, London, on Friday, Jan. 26th, at 3.30 P.M., when a paper will be read by Dr. W. J. Howarth, medical officer of health for the City of London, on the Treatment and Control of Venereal Diseases, with Special Reference to the Voluntary Hospitals. At the close of the proceedings the annual meeting of the association will be held to appoint officers for the ensuing year.

THE Royal Institute of Public Health has arranged an admirable series of public lectures on health problems under war and after-war conditions to be delivered every Wednesday afternoon at 4 P.M. from Jan. 17th to March 28th inclusive in the lecture room of the Institute at 37, Russell-square. Medical officers of health, medical practitioners, and all those engaged in public health and national services are invited to attend. The first lecture, on Wednesday next, will be delivered by Dr. Janet Lane-Claypon on Child Welfare Work, with Sir Robert Morant in the chair. Due notice of the other lectures will be given in the Diary.

**THE LANCET, VOL. II., 1916 :  
THE INDEX.**

THE Index and Title-page to the volume of THE LANCET completed with the issue of Dec. 30th will be ready on Jan. 22nd. Owing to the continued shortage in the paper-supply, the Index will not be issued with all copies of THE LANCET, as was the custom prior to the War. Subscribers who bind up their numbers are requested to send a post-card to the Manager, THE LANCET Office, 423, Strand, London, W.C., when a copy of the Index and Title-page will be supplied free of charge.

**PRISON COMMISSIONERS' REPORT.**

THE report of the Commissioners of Prisons and the Directors of Convict Prisons for the year ended March 31st, 1916, which has been presented to Parliament, does not contain the usual report of the Medical Commissioners. This report, along with those of the visiting chaplain and surveyor, having been omitted on the recommendation of the Committee on Public Retrenchment. A number of paragraphs in the report itself, however, deal with medical topics.

*Medical Matters Dealt with in the Report.*

The death-rate in local prisons from natural causes was 0·77 per 1000 prisoners received, the average for the previous 25 years having been 0·49 per 1000. The death-rate from natural causes in convict prisons was 8·2 per 1000 of the daily average population, as compared with 6·1 for the past ten years. But this apparent rise in death-rate must be brought into relation with the great alteration in the age-groups of the prison population. An earlier paragraph explains the alteration thus:—

The enlistment of many habitual petty offenders of military age can be inferred from the fact that for the year ended March 31st, 1914, the percentage of male prisoners of the age categories over 40 received on conviction formed 40 per cent. of the total population. For the year ended March 31st, 1916, this percentage had risen to 49, while the actual number of prisoners received of military age had fallen from 61,739 to 19,169 during these years.

The number of persons in local prisons found to be insane and certified as such after reception was 103, as compared with 126 last year, and in convict prisons 36, as compared with 26. Of the 103 cases certified in local prisons, 76 were found to be insane on reception and 7 exhibited symptoms of insanity within a month of reception. Many of those who were in prison for some time before the usual symptoms of insanity were observed were known to be of weak intellect or mentally impaired on reception, or to have been previously insane. As with the death-rate so with the incidence of insanity, the figures do not reflect the normal results of prison life.

The war has again had a marked effect on the average mental condition of the prison population, an effect which is described in the following interesting paragraph:—

One of the notable effects of the war on the prison population has been that the receptions are now for the most part confined to the physically and mentally weak. The general standard of physique is now much inferior to that of prisoners admitted into prison in normal times, while the percentage of strong able-bodied men is comparatively small. There is every reason to believe that the country's call for men appealed as strongly to the criminal as to other classes, and if it had been possible to place under scrutiny every case admitted into prison within military age, there is little doubt but that the vast majority of cases would have been found to be physically unfit. A young burglar, one of a gang of five, told the chaplain of a London prison that his four pals had enlisted; two had been killed and two others wounded. He said he meant to go and "do his bit" as soon as he got out of prison—a promise which he faithfully observed.

The number of prisoners who were released from local prisons on medical grounds, exclusive of pregnancy, &c., but including 8 cases temporarily released under Section 17 (6) of the Criminal Justice Administration Act, 1914, was 31 and from convict prisons 2. There were 4 suicides in local

prisons during the year and none in convict prisons. The daily average number of prisoners in hospital in local prisons was 361—225 males and 136 females—this being a proportion to the general prison population of 3·5 and 7·3 per cent. respectively. Thirteen cases of infectious disease were reported during the year—enteric fever, 3; erysipelas, 3; measles, 4; scarlet fever, 2; mumps, 1—as compared with 11 cases last year—viz., enteric fever, 1; chicken-pox, 2; scarlet fever, 2; diphtheria, 2; mumps, 1; and erysipelas, 3.

*Mental Deficiency Act.—Convictions for Drunkenness.*

As in the last year's report, allusion is again made to the difficulties which have arisen, owing to the outbreak of war and other causes, in the exercise of the Mental Deficiency Act so far as it relates to inmates of penal institutions. The Commissioners regard the record for the year under report as not an encouraging one. During the year 204 prisoners—130 males and 74 females—were certified under Section 1 of the Mental Deficiency Act, as compared with 248 last year. A large number of the 248 certified during 1914–15 have been received again, many several times, on re-conviction. Orders were made by the Secretary of State, under Section 9 of the Act, in 39 cases—10 males and 29 females—and these were removed to certified institutions, or, in the case of some of the females, to the Farmfield State Institution. In addition 26 males and 22 females were handed over to local authorities on discharge. The absence of institutional accommodation for defectives, and particularly State accommodation for males, exercises, in the Commissioners' view, a paralysing influence on operations under the Act as regards the disposal of criminal defectives. But a more hopeful note is struck for the future.

On the vexed question of the alleged increases of drunkenness among women much fresh light is thrown by an inquiry made by the Lady Inspector of Prisons into the character of the population committed for drunkenness to Holloway Prison.

The inquiry showed that during the three years 1913, 1914, and 1915, 10,888 committals on conviction of drunkenness were recorded against 1628 women, who, including the convictions incurred in years preceding 1913, had on their combined records a total of 30,986 convictions. Of these 1628 individual prisoners—

1092	were received in 1913, incurring that year	2768	convictions.
1045	" " 1914	3931	"
813	" " 1915	4189	"

The average convictions, therefore, per individual rose from 2·6 in the year 1913 to slightly over 5 in 1915. Amongst the 1628 women was selected a group of 25, who, at the end of 1915, had each received ten or more convictions for this offence. All are stated to have been first offenders in 1913 or 1914. By the end of 1915 they had amassed a total of 353 convictions—viz., 69 in 1913, 134 in 1914, and 150 in 1915. As regards first offenders in the drunkard class, the totals received in each year were 113, 113, and 37 respectively.

The inquiry at Holloway thus substantiated the observations of several governors and chaplains at other prisons—viz., that a falling population is at the present time contributing more convictions per annum than was the case before the war. If the average rate of convictions per annum incurred by each individual at Holloway Prison for the years 1913–14 and 1915–16 respectively be applied to the total receptions on convictions of drunkenness for the whole country, a result is arrived at which shows an actual falling-off of about two-thirds in the numbers received for this offence.

In connexion with this increased rate of convictions for drunkenness per individual the Commissioners comment on the curious fact that there should have been a great fall in the number of habitual drunkards committed to inebriate reformatories. So far as the metropolis is concerned, the numbers fell from 95 in 1913 to 9 in 1915. This is due in part to the war; but the failure of the Inebriates Act, 1898, to deal with the problem of habitual alcoholism must now, in the Commissioners' view, be admitted. The Commissioners sum up the matter thus: "If medical observation shows that mental causes enter into the history of the confirmed and hopeless inebriate, the Mental Deficiency Act now provides the opportunities for dealing otherwise with the repeated offence of drunkenness than by the useless, and, we might say, senseless, methods hitherto prevailing of repeated sentence to short terms of ordinary imprisonment. This affords no cure—perhaps only an encouragement. It is unscientific in principle, and further degrades the subject—man or woman."

## KING EDWARD'S HOSPITAL FUND FOR LONDON.

A MEETING of the Governors and General Council of King Edward's Hospital Fund for London for the purpose of awarding grants to the hospitals, convalescent homes, and consumption sanatoria for 1916 was held on Dec. 15th at St. James's Palace, London.

Lord IVEAGH, who presided, read a letter from the King congratulating the Council of the Fund on the distribution of £170,000 this year, £30,000 more than last year's total, and £12,500 over the previous record achieved in the years just before the war. His Majesty also expressed the hope that the public would help to maintain this record.

Lord REVELSTOKE (the honorary treasurer) reported that the net receipts for the year to Dec. 11th, apart from receipts on capital account, had amounted to £269,526 18s. 6d. This included £100,000 cash received from Sir Walter Trower in respect of the residue of the estate of the late Isabella Countess of Wilton, and the Fund had already had transferred to it securities amounting to over £22,000. The Finance Committee were retaining the cash uninvested, so as not to hamper the discretion of the Council in deciding as to the use of the money in the event of any emergency.

Sir WILLIAM COLLINS, on behalf of the League of Mercy, said there was hardly any reason to doubt that the League would be in a position to make for the fourth year in succession a grant of at least £14,000 to the King Edward's Hospital Fund, and also to make a distribution of something like £3000 in the extra-metropolitan district.

Sir WILLIAM CHURCH (the chairman of the Distribution Committee) presented a report which stated that the sum available for distribution amongst the London hospitals was £162,500, as against £133,500 in 1915. This was the largest sum that has ever been distributed by the Fund amongst the hospitals, being an increase of £29,000 over the last two years, and £11,500 over the previous maximum of £151,000 which was reached in the years immediately preceding the war. The increase in grants in aid of maintenance was £28,075, and became possible because of the postponement of building schemes and the reduction of grants towards capital expenditure. Of the capital grants of £19,075 recommended this year, only £6525 was on account of schemes begun since the outbreak of war on the ground of exceptional urgency; the balance had been devoted to relieving hospitals of capital liabilities incurred before the war. They had as far as possible distributed the increased grants in proportion to the probable urgency of need in 1916, and had given rather greater weight than usual to the more permanent elements which affected a hospital's power to stand increased financial strain, such as the relative amount of fixed income and the relative amount of available reserve funds; but the actual results of 1916 could not be taken into account until the next distribution. The number of hospitals applying for grants was 107, being three in excess of last year. The committee, Sir William Church continued, received yearly evidence of the increasing work done by the voluntary hospitals in the cure or prevention of disease in co-operation with State or municipal authorities, apart from the treatment of naval and military patients. This was one of the numerous ways in which the hospitals took their part in promoting public health. The latest development in this direction was the preparation by various hospitals of schemes for the treatment of venereal diseases in co-operation with the Local Government Board and the London County Council in accordance with the recommendations of the recent Royal Commission. In one case, that of the London Lock Hospital, an application for a capital grant in aid of sanitary and other improvements at the female hospital had been received, and in view of the importance of increasing the efficiency of this hospital in these respects the committee recommended a substantial grant towards the sanitary improvements. The committee further recommended that the Council, which had already by large grants enabled the Male Lock Hospital to be brought thoroughly up to date, should also offer substantial assistance towards an approved scheme for the reconstruction of the Female Lock Hospital.

Mr. F. M. FRY then presented the list of awards which has already been published in the press. The largest individual

grant, £15,000, has been given to the London Hospital, while Guy's Hospital follows with £9000. The smallest grants (£25) go to some of the cottage hospitals.

Dr. EDWIN FRESHFIELD (the chairman of the Convalescent Homes Committee) presented a report stating that the sum available for distribution amongst convalescent homes and consumption sanatoria was £7500, as against £6500 in 1915, the largest sum that had ever been placed at the disposal of the Convalescent Homes Committee. The number of applications eligible for consideration amounted to 42 from convalescent homes and 9 from consumption sanatoria, as against 41 and 9 respectively last year. The committee had made a slight increase this year in the number of beds reserved at consumption sanatoria for the use of patients in London hospitals, owing to the fact that certain women's beds no longer available had been replaced by children's beds. The accommodation thus secured amounted to 53 beds at six sanatoria.

The list of grants recommended by the Convalescent Homes Committee having been presented by Mr. J. G. GRIFFITHS,

Lord IVEAGH, in moving the adoption of the report and awards, said it was with great satisfaction that they found themselves able to make a record distribution, and this apart from supplementary grants rendered possible by the generosity of Sir Ernest Cassel. It was one of the functions of the Fund to serve as a steady influence on the finances of the hospitals. The amount which the hospitals would get from the Fund in grants to maintenance, even in this record year, was only a little more than one-ninth of the total ordinary expenditure; while the very large increase in the maintenance grants would not cover the increase in their ordinary expenditure since the war began, reckoning only the year 1915. There was no doubt, moreover, that the need of the hospitals would continue to grow in the near future. The burden of 1916 would inevitably be greater, and if the Fund was to continue to do its part an increased distribution might become desirable. He wished to express the indebtedness of the Fund for the legacies of £20,000 received, under the will of the late Lady Brownlow, on the death of Sir Charles Brownlow, and £10,000 very kindly allocated to the Fund by the executors of the late Thomas Stephen Whitaker in the exercise of their discretionary power.

The Duke of NORFOLK having seconded the motion, the adoption of the reports was carried unanimously.

A meeting of the General Council of King Edward's Hospital Fund for London was held on Monday afternoon, Jan. 8th, at the offices of the Fund, 7, Walbrook, E.C. There were present the Speaker of the House of Commons (the Right Hon. James W. Lowther, M.P.), in the chair; the Earl of Beesborough; the Viscount Knutsford; Lord Burnham; Lord Somerlayton (honorary secretary); the President of the Royal College of Physicians (Dr. Frederick Taylor); the Right Hon. C. Stuart-Wortley, K.C., M.P.; Sir William S. Church, Bart.; Sir Owen Philips, M.P.; Sir Horace Marshall; Mr. Frederick M. Fry (honorary secretary); Mr. John G. Griffiths (honorary secretary); Mr. Robert Fleming; Dr. Edwin Freshfield; Mr. W. J. H. Whittall. The appointments were announced of Mr. W. J. H. Whittall to the General Council and of Sir Edward Hope, K.C.B., to the Executive Committee. The resolutions providing for the work of the Fund for 1917, which were approved at the meeting of the Governors and General Council, were formally adopted.

## MEDICINE AND THE LAW.

### *Humphreys v. Miller, Rendell, and Harbord.*

In this case, as will be remembered, it was shown that a lodging-house keeper let rooms to Mr. H. C. Miller, who resided there with his daughter until his death from leprosy, being attended in his last illness by Mr. E. A. Harbord. The plaintiff afterwards brought an action, tried by Mr. Justice Darling with a special jury, claiming damages against the executor of the deceased, his daughter, and Mr. Harbord, on the ground that there was an implied warranty when the rooms were taken that Mr. Miller was not suffering from any disease which would make it unfit or dangerous for him to occupy them or would prevent them from being in future let as furnished rooms; that Miss Miller knew that her father was not a fit person to occupy the rooms; and

that the father, the daughter, and Mr. Harbord concealed the fact from the plaintiff, in consequence of which the rooms were let. After a great deal of evidence had been given the jury returned answers in the plaintiff's favour to all the questions put to them, finding as facts that Mr. Miller when he took the rooms was liable to infect persons and furniture with leprosy, and that he and his daughter knew it; that the disease was communicable by infection or contagion in England; that Miss Miller and Mr. Harbord fraudulently misrepresented Mr. Miller as fit to occupy the rooms; that they concealed from the plaintiff that Mr. Miller was suffering from a disease which made him unfit and dangerous to occupy the rooms; that Mr. Harbord, acting as agent for the other two, stated that Mr. Miller was not suffering from any contagious or infectious disease, and that this was untrue, as he and Miss Miller knew; that all three conspired to conceal the state of Mr. Miller from the plaintiff, and made false statements with that object. Damages to the extent of £250 were awarded. Counsel for Mr. Harbord asked for judgment for his client *non obstante veredicto*, on the ground that there was no obligation upon him to disclose his patient's condition to the plaintiff and no evidence that he did not believe that in this country leprosy was neither infectious nor contagious. After further argument to the effect that there was no evidence to support the jury's findings, Mr. Justice Darling gave judgment for the defendants.

The Court of Appeal has since affirmed the decision of Mr. Justice Darling. Lord Justice Swinfen Eady held that there is no foundation in law for the argument that there is a warranty or condition that when a person takes furnished rooms he shall not be suffering from any disease which may be infectious or contagious; that there was no evidence that Miss Miller knew that her father was suffering from leprosy or from any infectious or contagious disease. With regard to Mr. Harbord, the evidence showed that he had nothing to do with the original taking of the rooms; he had told the landlady, when questioned by her, that the deceased was not suffering from an infectious disease, but had warned her to be careful, and that no one else was to use the lavatory used by the patient. According to the evidence, the risk of infection with leprosy in this country was practically *nil*, and that was Mr. Harbord's view. He honestly expressed the opinion that he held, and was under no obligation to divulge to the lodging-house keeper anything with regard to his patient. Moreover, the plaintiff could have determined the tenancy by giving a week's notice to her tenants. His lordship held that in view of the above Mr. Justice Darling was right in holding that there was no evidence upon which to base any finding which involved either of the defendants in liability to the plaintiff. Lord Justice Bankes, in concurring, said: "I see no evidence whatever on which it can be suggested as against this medical man that he did not honestly believe that, speaking practically, there was no danger either of infection or contagion from this particular disease." The appeal was therefore dismissed. That this case should have ended as it did, and that Mr. Justice Darling's judgment should have been upheld is eminently satisfactory, and the medical profession as well as Mr. Harbord is to be congratulated upon the result arrived at. The charge made in claiming damages was a charge of deliberate falsehood and conspiracy involving known danger to the health of innocent people for the convenience and in the interest of the medical man's patient. It is established that of all this there was no evidence. The fact that a case of leprosy was involved with the exposition of medical opinion as to this disease added incidental interest to the trial.

#### *Coroners' Juries in War Time.*

Three sane and useful suggestions have been made by Mr. S. Ingleby Oddie in a letter to the *Times* for economising money and men's time in connexion with inquests. He recommends that the coroner should be enabled by an Act of Parliament (1) to hold inquests without a jury, or (2) to hold them with a jury of seven, or (3) to order post-mortem examinations before deciding that an inquest is to be held. Of these it will probably be agreed by many that the adoption of numbers (1) and (3) not alternatively but simultaneously would be a useful innovation, and if such adoption were to be for the period of the war only, would constitute an experiment which need not be continued if it should prove unsuccessful. The third suggestion deals with a recommendation often made by coroners, which found strong support

at the hands of the Departmental Committee on Coroners' Law in 1910. The first should be favourably considered by those who remember that many coroners are, and all might be, medical men with sufficient legal training for the performance of a coroner's duties so far as they entail knowledge of law. It may be pointed out that the economy of money, time, and man-power effected would be on a more important scale than that involved in the recent abolition of reports of certifying surgeons on accidents, which had a similar object in view. Also it would not involve injustice to anyone whose functions would be dispensed with, or any loss of protection to the persons on whose behalf they are now exercised.

#### *The Slingsby Case.*

In this case a declaration was claimed under the Legitimacy Declaration Act, 1858, with regard to the alleged child of Commander C. H. R. Slingsby. It will be remembered that Mr. Justice Bargrave Deane found that the child was borne by Mrs. Slingsby at San Francisco, the allegation on the other side being that he had been procured for her from another woman. The Court of Appeal held that the evidence did not justify the finding of Mr. Justice Bargrave Deane, and the appeal on behalf of the child to the House of Lords has now been dismissed. A curious feature of the case consisted in the calling in of Sir George Frampton, the well-known sculptor, to express an opinion upon the question of physical resemblance on the part of the child to the parents who claimed him as theirs. Sir George Frampton was of the opinion that a strong likeness existed, and the judge appears to have thought so too. As to this Lord Loreburn, in the House of Lords, expressed the opinion that Mr. Justice Bargrave Deane's views of the evidence must have unconsciously been influenced by Sir George Frampton, while Lord Sumner said that any weight that might be attached to likeness was overborne by other evidence.

## PUBLIC HEALTH OF MANCHESTER.

IN his recently published annual report Dr. James Niven gives an instructive account of the health of the city of Manchester in the year 1915, and of the various preventive measures carried out under his direction, special reference being made to the administrative action taken locally for the control of tuberculosis. The appearance of this volume shortly after the issue of Dr. W. H. Hamer's report<sup>1</sup> for the same period affords opportunity for comparing the statistical records and sanitary defences of a well-equipped provincial city with corresponding data for the metropolis.

The "recorded death-rate" of Manchester was equal to 16.31 per 1000 at all ages, or 1.42 below the decennial average rate. The tabular records submitted are less complete than previously, and there is great doubt as to the total population of the city. Owing to the large number of enlistments, the age constitution of the civil population has seriously changed. Nor is this change confined to the male sex, since recent alterations of occupation have affected the distribution of women also. Either for reasons of economy, in war time, or else because of uncertainty attaching to population estimates, many of the usual tables are omitted in this report. But this omission has to some extent been compensated for by the Registrar-General, who publishes detailed periodical returns of mortality and of disease notification in each of the great British towns.<sup>2</sup>

The national records deal with the entire areas of the several towns, but in the present report essential particulars are given for each of the statistical divisions of the city. From these we learn that, as compared with the decennial average, the crude death-rate in 1915 shows a marked improvement in North Manchester and a considerable improvement in South Manchester, but a falling off in the old Manchester township. This supports the conclusion previously reached, that the poorer classes have suffered disproportionately in the last two years. Nevertheless, the average position of the Manchester working classes is believed to have improved, and there has been less pauperism in 1915 than in the two preceding years. In order to avoid

<sup>1</sup> THE LANCET, 1916, II., 837.

<sup>2</sup> THE LANCET, 1916, II., 1024

the uncertainty attaching to estimates of population, the actual deaths (in place of the death-rates) from the chief causes in the last three years are summarised in an instructive table. The most striking feature in this table is the great increase in the deaths from tuberculous phthisis and from heart disease in 1915, as compared with the year preceding the war. This abrupt rise, especially in the case of the first-named disease, may be due in part to the strain induced by war conditions and in part to the lack of new dwellings for the growing population. Balancing the gains and losses of life during 1915 in comparison with those in the previous ten years, the largest gains are found to be under the heads of pneumonia, whooping-cough, nervous disease, and diarrhoea. The losses are greatest under the heads of cancer, heart disease, and old age.

*Infantile mortality.*—Inasmuch as the mortality in the first year after birth is based, not on the numbers estimated to be living at that age, but on the number of infants born alive during the year, it is obviously unaffected by uncertainties as to population. It is also independent of the birth-rate. In the year under notice infant mortality in Manchester was at the rate of 129 per 1000 births, as compared with 112 in London, 117 in the 96 great towns, and 110 in England and Wales.<sup>3</sup> Infant mortality in the first three months of life was lower than in any previous years. It was also low in the second three months, but in the last half of the first year it was comparatively high. Compared with the preceding three years, we learn that during the first three months after birth proportionally fewer deaths occurred in 1915 from convulsions, premature birth, atrophy, and suffocation—i.e., from that class of disease which it is our main object to prevent. In the second three months the relation is less favourable. During the last half of the first year of life there were in 1915 relatively fewer deaths from whooping-cough, tuberculosis, and convulsions, but relatively more from measles, diphtheria, lung disease, and violence, the excess under lung disease being probably determined by measles prevalence.

#### *Administrative Control of Pulmonary Tuberculosis.*

Towards the close of last century a national movement was initiated for the suppression of tuberculosis. In a recent classical work<sup>4</sup> entitled "A Campaign against Consumption," by the late Dr. Arthur Ransome, then professor of public health in the Victoria University, the history of that movement was traced to its local origin half a century ago. The author asserts that the honour of being the first authority to suggest and eventually to adopt measures for the suppression of this scourge may fairly be claimed by Manchester. Dr. Ransome's own entrance into the campaign dates back to the year 1860, and to the establishment in Manchester and Salford of a weekly return of common diseases, prominent among which was phthisis. There is good reason to believe that these returns, voluntarily contributed by about 30 medical residents for more than 12 consecutive years, were not merely the forerunners but powerful incentives to the more complete notification returns which are now everywhere required under statute law. In 1884 a large area of old and dilapidated dwellings in Ancoats was officially condemned as unfit for human habitation. This area was supposed to afford shelter for 5600 persons of the poorest class, who on a five years average were succumbing to phthisis at the rate of 5·3 per 1000 living. The buildings on this area, and other insanitary areas in the older parts of the city have recently been demolished by the municipality, and better house accommodation has been provided for the displaced occupants.

*Notification of tuberculous phthisis.*—Dr. Niven will be recognised by his medical colleagues generally as one of the earliest among advocates of the compulsory notification of phthisis, as well as of its preventive treatment, as a matter of State policy. He is to be congratulated on the large measure of success he has achieved in Manchester in dealing with the administrative difficulties of the crusade—difficulties which were at one time regarded as insurmountable by many of his contemporaries. Systematic notification of phthisis is still on its trial in Manchester, London, and some other towns, and as local experience accumulates the results should materially influence administrative action.

<sup>3</sup> See table on p. 41 of Registrar-General's return for the fourth quarter of 1915.

<sup>4</sup> Published in 1915 by the Cambridge University Press. Pp. 263. Price 10s. 6d.

In the present report there appears a standard table showing the number of primary notifications during the year. This table is identical in form with that contained in Dr. Hamer's London report; and we may presume that the respective health officers will avail themselves of this and similar methods for the comparison of future results. The usual table showing the facts and rates of notification in the several districts has been prepared for 1915, but is not inserted in this report. The notification-rate exceeds the death-rate in various degrees. The case of Withington is especially notable. In this residential district the deaths steadily outnumber the reported cases, pointing to a failure in the duty of notification. The earliest records available respecting the results of notification are those for 1899—since which year more than 28,000 phthisical patients have been visited by the staff. In 25,000 cases sputum has been examined, with positive results in one-third of the cases. Not fewer than 27,106 of the patients have been isolated in hospital and the houses disinfected after removal of the patients.

The loss of life from phthisis in 1915 was in excess of the average. It was 1·76 per 1000 living of both sexes at all ages, and was above the mean rate in the preceding ten years by 0·09 per 1000. It was also above the rate in the County of London by 0·16 per 1000. When the total deaths in a single year are distributed over several age-groups in both sexes, the rate of mortality for each separate group cannot usefully be compared with corresponding rates for previous years. Nevertheless the number of deaths at each age may properly be compared, and thus an approximate idea of the course of events may be presented. By this means we learn that among males the phthisis deaths were more numerous in 1915 than in any of the preceding ten years. (This statement relates exclusively to the civil population, which includes Manchester soldiers discharged on account of phthisis.) The most marked increase occurs at ages 15-19, 20-24, and 35-74, but not at ages 25-34, nor at ages under 15. Among females also there is a corresponding excess in the deaths, the increase being nearly as great as among males. The greatest increase occurs at ages 25-34. It is possible that the additional stress of work now thrown on both sexes, and the inordinate demand for workers in the prime of life may account for the great addition to the death toll. When the deaths from bronchitis are examined similarly, they present parallel rises to those from phthisis, both among males and females. Pneumonia shows no such increase; on the contrary, among males the deaths thus returned in 1915 were fewer than in any of the preceding ten years. Among females they were fewer than in any of the ten except 1906.

*Milk and tuberculosis.*—The milk-supply of Manchester is derived from about 69 farms, chiefly in the counties of Cheshire, Derbyshire, Staffordshire, and Lancashire. During the year 91 samples of milk were examined, and in a useful table the percentages are given of farmers in each county whose milk was found to cause tuberculosis. It is noteworthy that none of the farmers in Derbyshire or in Staffordshire sent tuberculous milk to the city. In Dr. Niven's report for 1913 particulars were given of the successful manner in which the work of keeping a herd of cows free from tuberculosis is being carried on. The milk produced by this herd is still supplied to the large fever hospital at Monsall and to the sanatorium at Baguley.

*Poverty in relation to phthisis.*—A most instructive table is inserted giving a classification of the cases whose family income fell short of a standard rate according to the ascertained "shortage," and showing the institutional assistance obtained for these patients. The standard was based on that given by Mr. B. Rowntree in his book on poverty. The table indicates under several headings the numbers living and the numbers dead at the end of 1915, the numbers admitted to the several hospitals, and the number receiving institutional assistance. It would appear from this table that in 1915 phthisis was more fatal to the poorer classes of cases than in previous years.

#### *Report of the Tuberculosis Officer.*

A valuable report by Dr. D. P. Sutherland is appended to that of the medical officer of health. It contains minute details of the manifold operations of his department in the course of the year. We can only briefly refer to the analysis of cases in which the results of institutional and dispensary treatment are shown. In the "residential

department" 965 cases were treated in the several institutions, of which 505 were discharged "improved," 92 "without improvement," and 76 died. At the end of the year 221 cases remained under treatment. In the dispensary department 502 cases were treated, 212 of which were discharged as improved and 99 as without improvement, whilst 11 died. At the end of the year 132 patients still remained under treatment. Dr. Sutherland concludes his report with the encouraging statement that during the year 152 insured notified cases were found to have so far recovered that no evidence of active tuberculosis could be demonstrated; these are therefore to be regarded as arrested cases. They will, however, still remain under observation, and their health and working capacity will be reported upon periodically.

## IRELAND.

(FROM OUR OWN CORRESPONDENTS.)

### *Annual Report of the Local Government Board for Ireland.*

THE annual report of the Local Government Board for the year ending March 31st, 1916, is a slim pamphlet of some 60 pages instead of the portly volume to which we have been accustomed. This economy of paper and printing has been effected by the omission of the multitudinous tables and returns which used to appear as appendices to the report proper. The tables, though not published, have been prepared as usual, and are available for reference. The figures relative to poor-relief show a rising improvement. The numbers in workhouses, including sick, aged and infirm, lunatics, idiots and imbeciles, have decreased markedly, while the numbers in the extern institutions, and more especially those receiving outdoor relief, have diminished both individually and in the aggregate. In the workhouses the deaths have decreased by 581 on the number of the previous year, and the total number of deaths from tuberculosis have decreased by 167, thus keeping up the record of diminution which has existed without a break since 1912. The deaths of infants show a decrease of 272. A graceful tribute is paid in the report to the large number of medical officers who have volunteered for service with the forces of the Crown, while the difficulty of finding adequate assistance in caring and attending on the sick poor is also commented on. The notification of tuberculosis is being gradually extended, and some local bodies have passed resolutions in favour of the general introduction of the system. The report announces with regret that "notification is not infrequently delayed until a late stage in the disease," and asks that care should be taken in all cases to notify before the infection has reached an advanced stage. Unfortunately, the Local Government Board ignores that under the conditions prescribed by the Board itself for the notification of tuberculosis it is only rarely that it is legal to notify the disease in the early stages. A medical man notifying the disease except under the prescribed conditions would leave himself open to an action for damages. In speaking of its care of the Belgian refugees thanks are given to the medical men and the hospitals of Dublin for the free advice and treatment rendered during the year.

### *Doctors of Military Age in Ireland.*

The legal adviser of the Irish Local Government Board, Dr. Vanston, K.C., has given his opinion that the Board had an absolute discretion, under Section 8 of the Act, 14 and 15 Vict., cap. 68, to refuse their approval, as they thought proper, for any reason, or without giving any reason, to the appointment of a medical officer of a dispensary district made pursuant to statute by a board of guardians. Further, Dr. Vanston states that the Letterkenny board of guardians have no power to remove Dr. Walker from the office of temporary medical officer by passing the resolution of Sept. 8th, 1916, which was *ultra vires* and of no legal effect. In the face of these facts, communicated by the Local Government Board, the Letterkenny board of guardians, by a motion passed by a majority at their last weekly meeting, have decided to instruct their solicitor to take the necessary proceedings to compel the Local Government Board to sanction Dr. J. P. McGinley's appointment.<sup>1</sup>

### *Infectious Diseases in Ireland.*

The following table in regard to infectious diseases in Ireland appeared in one of the Belfast papers of Dec. 28th, 1916. These are notifications:—

Week ending—	Dublin.					Belfast.					
	Scarlet fever.	Diphtheria	Enteric fever.	Bryspela	Total notifications.	Week ending—	Scarlet fever.	Diphtheria	Enteric fever.	Bryspela	Total notifications.
Nov. 18th ...	8	3	8	1	25	Nov. 18th ...	22	4	9	7	43
Nov. 25th ...	5	1	6	3	24	Nov. 25th ...	10	5	6	4	25
Dec. 2nd ...	7	3	2	0	20	Dec. 2nd ...	15	4	4	3	26
Dec. 16th ...	3	3	2	3	15	Dec. 16th ...	14	3	5	5	23
<b>Total ...</b>	<b>23</b>	<b>10</b>	<b>18</b>	<b>7</b>	<b>84</b>	<b>Total ...</b>	<b>61</b>	<b>16</b>	<b>24</b>	<b>19</b>	<b>122</b>

The disease "tuberculous phthisis" is now omitted. The anomalous figures under this heading were made the subject of comment in THE LANCET, when it was pointed out that, while only a few cases of phthisis were, as a rule, notified in Belfast, quite a number of notifications appeared in the Dublin list. The explanation, if such it can be called, is said to be the difficulty of notification in Ireland, to which allusion has been made. The disappearance of the figures from the official table does not lessen the difficulty.

Jan. 8th.

## THE SERVICES.

### ROYAL NAVAL MEDICAL SERVICE.

To be temporary Surgeons: A. Orr-Ewing and R. Cripps. Surg. J. R. Haldane is placed on the Retired List.

### ARMY MEDICAL SERVICES.

#### TERRITORIAL FORCE.

Capt. A. N. S. Carmichael, from attached to Units other than Medical Units, to be Deputy Assistant Director of Medical Services.

### ROYAL ARMY MEDICAL CORPS.

Lieut.-Col. E. Brodrribb is restored to the establishment.

To be temporary Lieutenants-Colonels: Col. V. Matthews, late R.A.M.C. (Vols.), whilst specially employed; and H. M. Rigby (Capt. R.A.M.C., T.F.).

W. E. Home, Fleet Surgeon, R.N. (ret.), to be temporary Major.

To be temporary Honorary Majors: R. Armstrong-Jones and H. W. White.

To be temporary Captains: Temp. Lieut. F. W. H. Hutchinson, C. G. Whorlow, R. Williams and C. H. Treadgold.

To be Lieutenant: B. Mountain.

To be temporary Lieutenants: J. K. Watson, C. D. H. Corbett, A. B. Goldie, H. H. Fairfax, S. G. J. Dowling, A. C. S. Waters, H. H. White, F. C. Sprawson, F. Simpson, W. F. Gibb, C. M. Atkinson, A. G. Macdonald, A. B. McMaster, F. Challans, C. E. Tangye, P. J. O'Sullivan, P. A. Leighton, M. H. A. Wallie, R. O. Whyte, L. B. C. Trotter, I. G. Cobb, C. K. Smith, J. H. Mayston, H. Freeth, A. Leitch, J. Young, M. H. Raper, T. H. Macfie, B. A. Slocumbe, M. Henry, O. L. Williams, and H. G. Peel.

Temporary Captains relinquishing their commissions: J. Burfield, R. J. Jones, and T. F. Weakliam (on account of ill-health).

Lieutenants relinquishing their commissions: F. J. R. Forster, J. D. Shields, V. K. O'Gorman, and M. F. Hession.

#### TERRITORIAL FORCE.

Capt. B. Robertson, from a Field Ambulance, to be Captain.

Capt. H. M. Rigby, Capt. E. D. Macnamara, and Capt. A. D. Reid are seconded whilst holding temporary commissions in the R.A.M.C.

Capt. J. M. Hunt to be temporary Major.

Capt. H. G. F. Dawson to be Major.

Lieutenants to be Captains: F. F. T. Hare, S. Childe, and C. P. Sells.

Capt. (temp. Major) J. E. W. Mac Fall relinquishes his temporary rank on ceasing to command a Field Ambulance.

Capt. (temp. Major) J. Young to be temporary Lieutenant-Colonel whilst commanding Field Ambulance.

Lieut.-Col. F. J. Knowles, from Territorial Force Reserve, to be Lieutenant-Colonel, without pay or allowances.

Capt. F. B. Smith, from a Field Ambulance, to be Captain.

Captains relinquishing their commissions: E. P. Dawes, W. H. Calvert, and B. S. Wills.

#### TERRITORIAL FORCE RESERVE.

Capt. W. N. W. West-Watson, from a casualty clearing station, to be Captain.

#### SPECIAL RESERVE OF OFFICERS.

Lieut. (on probation) R. R. Scott is confirmed in his rank.

#### INDIAN MEDICAL SERVICE.

Temporary Lieutenants to be temporary Captains: Kamberanda Karap, Mandara and Jeangir Kalkhusro Nariman.

The retirement of Capt. Jogesh Chandra Dey has been confirmed by the King.

<sup>1</sup> See THE LANCET, 1916, ii., 497.

Col. W. W. Clemensha, Sanitary Commissioner with the Government of India, is at present working temporarily as health officer of Delhi, pending the arrival of a permanent incumbent.

#### DEATHS IN THE SERVICES.

Surgeon-General Sir Edmond Townsend, K.C.B., C.M.G., A.M.S., on Jan. 3rd, at his residence, Clontymon, Co. Cork, aged 71, after a long record of active service. He entered the Army in 1867 and served in the Abyssinian campaign 1867-68 (medal), in the Malay Peninsula 1875-76, where he was severely wounded (medal with clasp), and in the Zulu war, where he was present at the battle of Alundi in 1879 (mentioned in despatches). He also served in the Egyptian war of 1882, including Kassassin, Tel-el-Kebir (medal with clasp and Khedive's Star), in the Burmese Expedition 1885-86 (medal with clasp), and in the Ashanti Expedition (mentioned in despatches and star). He was with the forces in the North-Western Frontier of India campaign 1897-98. Principal Medical Officer with the Mahratta Field Force and Principal Medical Officer with the 1st Division in the Tirah Expeditionary Force (mentioned in despatches, C.B., and medal with two clasps). In the South African war of 1899-1902 he was Principal Medical Officer with the 1st Division and afterwards in the Western District (dangerously wounded, mentioned in despatches, C.M.G., Queen's medal with four clasps, and King's medal with two clasps). From 1902 till his retirement from the service in 1905 he was Principal Medical Officer at Netley

#### VITAL STATISTICS.

##### HEALTH OF SCOTCH TOWNS.

In the 16 largest Scotch towns 969 births and 872 deaths were registered during the week ended Saturday, Dec. 30th, 1916. The annual rate of mortality, which had increased from 13·8 to 19·6 per 1000 in the four preceding weeks, fell to 19·2 per 1000 in the week under notice. During the 13 weeks of last quarter the mean annual death-rate in these towns averaged 15·3, against 15·6 per 1000 in the large English towns. Among the several towns the death-rate during the week ranged from 9·3 in Ayr, 11·4 in Leith, and 13·7 in Clydebank, to 23·0 in Perth, 26·7 in Hamilton, and 29·9 in Dundee.

The 872 deaths from all causes were 20 fewer than the number in the previous week, and included 50 which were referred to the principal epidemic diseases, against 37 and 46 in the two preceding weeks. Of these 50 deaths, 13 resulted from infantile diarrhoeal diseases, 11 each from whooping-cough and diphtheria, 10 from measles, 3 from scarlet fever, and 1 from enteric fever. The annual death-rate from these diseases was equal to 1·1, against 0·7 per 1000 in the large English towns. The deaths from infantile diarrhoea, which had been 14, 10, and 9 in the three preceding weeks, rose to 13, of which 9 occurred in Glasgow. The deaths referred to diphtheria, which had been 6, 3, and 6 in the three preceding weeks, rose to 11, and included 4 in Glasgow and 2 each in Edinburgh and Dundee. The fatal cases of whooping-cough, which had been 3, 7, and 12 in the three preceding weeks, numbered 11, and comprised 4 in Glasgow, 3 in Edinburgh, and 2 in Leith. The deaths attributed to measles, which had been 12, 11, and 14 in the three preceding weeks, fell to 10, of which 8 occurred in Dundee. The 3 deaths from scarlet fever were slightly below the average in the earlier weeks of the quarter. The 2 fatal cases of enteric fever occurred in Glasgow.

The deaths referred to diseases of the respiratory system, which had increased from 118 to 227 in the four preceding weeks, further rose to 240 in the week under notice, and were 85 above the number registered in the corresponding week of 1915. The deaths from violence numbered 27, against 34 and 33 in the two preceding weeks.

##### HEALTH OF IRISH TOWNS.

In the registration area of Dublin 130 births and 216 deaths were registered during the week ended Saturday, Dec. 30th, 1916. The annual rate of mortality, which had increased from 17·7 to 25·6 per 1000 in the four preceding weeks, further rose to 28·4 in the week under notice, against 23·7 per 1000 in London.

The 216 deaths from all causes included 24 of infants under 1 year and 73 of persons aged 65 years and upwards. Five deaths were referred to infantile diarrhoea, 4 to measles, 2 to whooping-cough, and 1 to scarlet fever. The causes of 19 deaths were uncertified, and those of 9 others were the subject of coroners' inquests, while 79, or 37 per cent., of the total deaths occurred in public institutions.

During the same period 133 births and 159 deaths were registered in the city of Belfast. The deaths corresponded to an annual rate of 21·3 per 1000, and included 14 of infants under 1 year and 52 of persons aged 65 years and upwards. Two deaths were referred to infantile diarrhoea and 1 each to measles and diphtheria. The causes of 5 deaths were uncertified, 8 inquests were held, and 38 of the total deaths occurred in public institutions.

**RUSSIAN MEDICAL SCHOLARSHIPS.**—The director of the Higher Institute of Medicine for Women at Petrograd has received an anonymous gift of £20,000 for the foundation of scholarships in the name of Count Vorontzoff, who died last year.

**CENTENARIANS.**—Mrs. Elizabeth Symons, of Church Town, Crowan, died recently, aged 102 years and 10 months. She is stated to have been the oldest person in Cornwall.—Mr. Samuel Stidwill, of 6, Union-street, Stonehouse, Plymouth, died on Dec. 26th, 1916, aged 102 years.—Mrs. Harriet Godland died recently at an almshouse in Ilton, Dorset, in her 104th year.—Mrs. Mary M'Quade, Omeath, S. Louth, died on Jan. 4th at the remarkable age of 110 years. She spoke English and Irish fluently, and is said to have been the oldest woman in Ireland. She resided all her life at Omeath, and her age has—it is stated in the papers—been verified by church records.

#### Correspondence.

"Audi alteram partem."

#### THE LIQUOR TRAFFIC AND THE FOOD QUESTION.

To the Editor of THE LANCET.

SIR,—In your leading article under this title you comment on the effect of the regulations of the Liquor Control Board in decreasing drunkenness and alcoholic disease as measured by the most characteristic manifestation of alcoholism, delirium tremens. In the report of the Liquor Control Board, issued a few days ago, statistics are given which show a reduction in the number of female convictions for drunkenness of 43·8 per cent. in England and 37·7 per cent. in Scotland, and the Board regards these figures as effectively disproving the common assertion that, while drunkenness among men may have diminished, it has increased among women. My experience as physician-in-charge of the alcoholic wards in the Royal Infirmary, Edinburgh, leads me to believe that there is an important fallacy in the data founded on; and it is in the public interest at the present time that attention should be drawn to it.

During the past year there has been a very unusual strain on the wards in question, and more especially for female patients. The number of patients suffering from acute alcoholism—nearly all brought in by the police—who were sufficiently ill to necessitate their being treated as in-patients was double the average of previous years. The accompanying table shows the record for admission of men and women, and also the number of women arrested for drunkenness during the same period:

	Admissions to wards.		Arrests for drunkenness. Females.
	Males.	Females.	
1913	198	52	1719
1914	185	51	1961
1915	169	53	1721
1916	151	108	1222

This increase in alcoholic cases is confirmed in the experience of the out-patient department of the hospital, where less serious cases are treated for injuries received under the influence of liquor; statistics on this point are not, however, available, as the patients are classified according to the surgical conditions.

We have, therefore, an anomalous position, the experience of the hospital pointing conclusively to a marked increase of alcoholism among women; the statistics of the police under the headings of "Convictions for Drunkenness" and "Arrest for Drunkenness" pointing in the opposite direction.

If the experience in Edinburgh can be taken as an index of conditions obtaining elsewhere, it seems clear that the Liquor Control Board is hardly justified in the conclusion it has drawn from the data supplied by the police reports. I am aware that in former reports the Liquor Control Board has given statistics in regard to admissions for delirium tremens, mostly, I think, in English hospitals. In this connexion it is important to keep in mind that, in Scotland at any rate, only a proportion, and a small one, of cases of acute alcoholism come into the category of delirium tremens.

I am, Sir, yours faithfully,

Edinburgh, Jan. 8th, 1917. CHALMERS WATSON, M.D. Edin.

\* \* The curious discrepancy to which Dr. Chalmers Watson calls attention is explained by the Prison Commissioners, to whose report we allude in another column. Fewer women have been convicted of drunkenness, but the average number of convictions per individual has risen to such an extent as actually to increase the total number of convictions.—ED. L.

To the Editor of THE LANCET.

SIR,—I have read the leading article on the liquor traffic and the food question, in which you comment adversely on total prohibition. In the first place you say its enforcement would not be easy. Why not? If the conscription of our

sons has been attained, why not the conscription of our luxuries? It is the easiest and only way of solving the liquor question; all else is mere tinkering with the evil. Secondly, you put up a problematical case of evil resulting from the sudden cessation of alcohol, especially in elderly men who have been accustomed to it, and dwell on the possibility of restricted output on this account. This theoretical diminution, which I dispute, would be a mere drop in the bucket compared to the actual diminution which is at present going on in munition works from over-indulgence in alcohol by workers who carry it in, and find opportunities to consume it at their work. Prohibition would undoubtedly vastly increase the output of war munitions, at least, in Glasgow and Clyde district. Your third argument against prohibition is the use of other substances—methylated spirit, varnish, lacquer, and the poisonous effects on those who drink them. Why should we distress ourselves about these degenerates who will not deny their appetites? Is it for the protection and preservation of this portion of our race that we are sending our sons into battle?

Your alternative to prohibition of imposing restrictions in the hours of sale and quality of liquor as advocated by the Liquor Control Board has been a complete failure in Scotland. In to-day's *Glasgow Herald* an Edinburgh doctor gives statistics showing that in the Royal Infirmary there the number of acute alcoholic cases admitted to the female ward was twice as great as in 1913-14, although the convictions for drunkenness in the police courts had fallen by 500. A publican patient of mine tells me that he is quite satisfied with the restricted hours of sale as he is selling a half more liquor than before it with less labour and expense. The long queues of women seen in Glasgow lately waiting to get bottles filled before the New Year closing days show the utter futility of these restrictions, and the after-results are seen in our own Royal Infirmary, where probably one-half of the surgical cases are the direct result of alcoholic indulgence. When you know of women admitted there this week with their faces trampled on by drunken husbands and another jumping out a second-storey window to escape from the violence of a drunken madman you can only conclude that the total prohibition of alcohol is the only efficient way.

If a new disease were to make its appearance in the land bringing in its train one tithe of the wastage and suffering to innocent people that alcohol does it would not be tolerated for a moment. State ownership would not cure the drinking habits of Scotland—they don't care who owns the public-house, their object is to get enough to make them feel the effects of the alcohol. Till we as a nation get a Government that will help us to purge ourselves from our national sins we cannot hope, nor do we deserve, to win the war.

I am, Sir, yours faithfully,  
JAMES DUNLOP, M.B., C.M. Glasg.

Glasgow, Jan. 6th, 1917.

\*\* No one contradicts much of what Dr. Dunlop says. It is common knowledge. The enforcement of prohibition, on which we did not comment adversely, is difficult, because a vested interest, subject to good conduct, has been recently conferred upon owners of licensed properties. The actual circumstances have to be looked at, lest in the search for what may later be the best we lose the present good.—ED. L.

## AGGLUTINATION REACTIONS IN TYPHOID AND PARATYPHOID FEVERS.

To the Editor of THE LANCET.

SIR,—It would appear from recent publications that Dreyer, Ainley Walker, and Gibson are of opinion that they were the first to realise the fact that repeated agglutination tests are necessary before arriving at a definite diagnosis in cases of the enteric group in inoculated men.

In a paper published by them in THE LANCET, 1915, i., 324, they made the following statement when dealing with this subject:—

It is probable that the absence of accurate diagnosis in the past explains the fact that statistical results arrived at in our Army have not always been so convincing as would otherwise have been the case.

The above remark is quite untrue of later years and an injustice to officers of the Royal Army Medical Corps.

I feel that it is only right to point out that repeated observations by the macroscopic method of the serum agglutinin content in cases of suspected typhoid and paratyphoid fevers have been taught at the Royal Army Medical College, and carried out by Army bacteriologists since the re-introduction of typhoid inoculation in the Army in 1905.

The necessity for using Dreyer's technique to arrive at reliable results, as suggested in a paper by Ainley Walker in THE LANCET of Nov. 25th, 1916, is not apparent, and equally reliable results can be and have been obtained when using a living suspension of bacilli, provided the suspension is standardised.

The following extracts will show that repeated observations were found to be necessary in past years, and it will be noted that these extracts are from reports and papers published some time before the appearance of papers by Dreyer, Ainley Walker, and Gibson; in fact, before they had probably had very many opportunities of noting the serum reactions in inoculated individuals suffering from fevers of the enteric group, especially in the case of paratyphoid A fever, which rarely found its way west of Suez before this war.

The first is from an abstract of report on the enteric fever dépôt at Naini Tal, taken from the annual reports of divisional sanitary officers in India for 1908, published in 1909.

Some of these errors in diagnosis are due to the fact that the men had been inoculated, and therefore their blood gave a positive Widal reaction, and they were diagnosed enteric fever on the strength of this alone. In all cases of fever in inoculated men the blood should be taken near the beginning and towards the end of the fever. If the two results are the same the case is probably not enteric. If there is a marked rise in the agglutination titre the case is certainly one of enteric fever. Every case of true enteric fever should give a complete reaction in a dilution of 1/100 at some period of the disease. In the case-sheets of many of the men sent here it is noted "Widal reaction 1/40." Now nearly all inoculated men will give a positive reaction in this dilution for months and in some cases for years after inoculation.

Again, in the 1910 report from the same dépôt we find the following:—

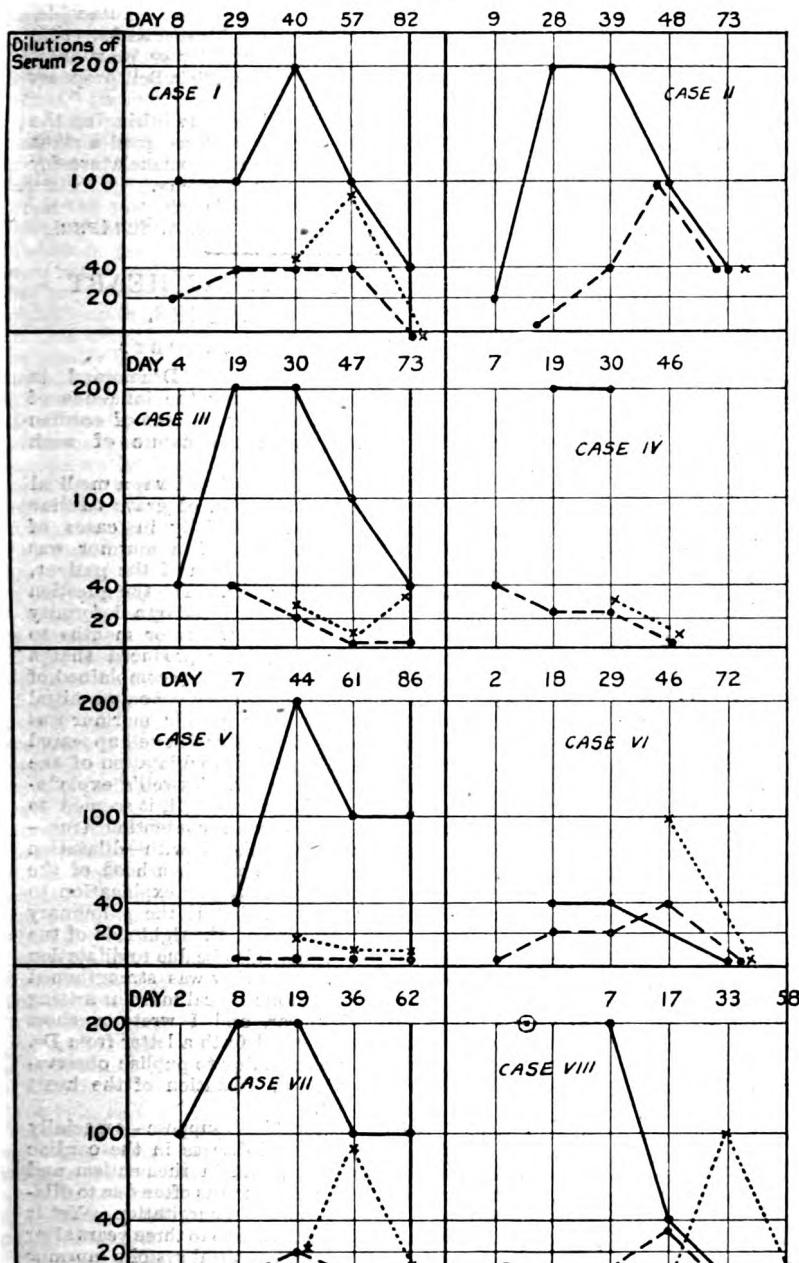
In paratyphoid fever the Widal reaction is invariably raised for the *B. typhosus*, especially during the first week of fever, and may be just as high for this bacillus as that shown during an attack of ordinary enteric fever. The reaction for para. A is as a rule lower and may only be present in such dilutions as 1/20 and 1/40 and possibly only a trace in the latter; it is also as a rule transient and may only be found for a few days in the later stages of the disease or early days of convalescence, and as a rule disappears in a few weeks, although in some cases we have found it a year after the fever. The group agglutinins for typhoid also disappear rapidly in contrast to the specific agglutinins after an attack of true typhoid fever, which remain raised for months and years in some cases. Thus we have the apparent anomaly of a man passing through a fairly severe attack of enteric fever (clinically) and giving a few weeks later an entirely negative reaction. This has happened here in several cases from whose blood the *B. para. A* had been isolated and whose agglutination titre had (during the fever) been high for both typhoid and para. A. In some cases, also, the paratyphoid reaction may entirely disappear, leaving a raised titre for *B. typhosus*, and again very rarely the titre for paratyphoid may remain raised without any agglutinins for *B. typhosus*.

An article published in the *Journal of the Royal Army Medical Corps* also points to the fact that army bacteriologists were quite alive to the importance of repeated Widal estimations in 1910. The paper referred to is "An Inquiry into a Small Epidemic of Paratyphoid Fever in a Camp in India," by Major H. W. Grattan, R.A.M.C., and Major D. Harvey, R.A.M.C.<sup>1</sup>. In this epidemic all the men who contracted the fever were inoculated against *B. typhosus*, and it is interesting to note that the bacillus was recovered from the blood in every case but one. The charts of the agglutination curves were published and are here reproduced. (See Chart I.)

To take another example. Chart II. is from a paper published in the *Journal of the Royal Army Medical Corps*, 1911, xvii., showing agglutination curves in a case of

<sup>1</sup> Journal of the Royal Army Medical Corps, 1911, xvi., 9.

CHART I.



*B. Typhosus* ..... •  
*B. Paratyphosus A* ..... - - - - -  
 Own strain of *B. Paratyphosus A* ..... ○

An observation 10 days before patient felt ill..... ○

paratyphoid A fever occurring in a man inoculated against *B. typhosus*.

This paper by Major H. W. Grattan, R.A.M.C., and Captain J. L. Wood, R.A.M.C., gives an excellent account of the serum reactions of cases of paratyphoid A fever in inoculated men, and also mentions the frequency of the low titre of the serum for para. A. This point Professor Dreyer laid stress on at a meeting of the Royal Society of Medicine on Nov. 9th, 1915. His words at the meeting were :—

..... In every case bacteriologically proved to be a typhoid or paratyphoid B infection, the agglutination method gave a positive diagnosis (i.e., 100 per cent. of the cases), while in the case of paratyphoid A infection the agglutination test failed in only about 7 per cent. of the cases. Why are the

results with paratyphoid A relatively so poor? The reason is that for a considerable time I did not know how low is the agglutination given by paratyphoid A in certain cases.

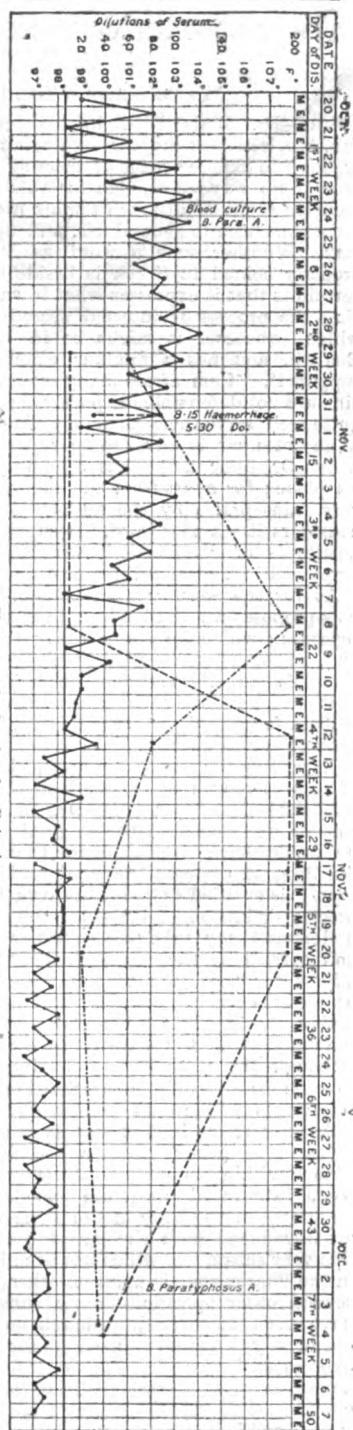
This in the year 1915, and after he had been working with the two officers mentioned above, while all of the papers referred to in this communication were published before the end of 1911. The evidence brought forward will, I think, establish the fact that bacteriologists in the service were not quite so behindhand in the bacteriology of the enteric group of fevers as Drs. Dreyer, Ainley Walker, and Gibson would lead us to believe.

I am, Sir, yours faithfully,

H. GRAEME GIBSON,  
Captain, R.A.M.C.

Royal Army Medical College, Dec. 30th, 1916.

CHART II.



## THE NOMENCLATURE OF "INTERNAL SECRETION."

*To the Editor of THE LANCET.*

SIR.—Dr. Blair Bell, in his letter in your issue of Jan. 6th, censures me for employing the term "endocrine organs" to denote organs of internal secretion. I am, however, in no way responsible for this term, as Dr. Blair Bell seems to suppose, although I think it convenient. It has for some time been in general use, and appears to have come to stay. Whether such a word as "endocrine" could be properly coined in Greek is beside the question. What is certain is that it expresses what is wanted to be expressed—viz., the process of internal secretion, by a simple word, which, whatever it might be in Greek, is good enough English, and has a familiar example in "endogen" to support it. I am afraid many scientific terms used in medicine are not defensible on purely etymological grounds, yet quite well serve their purpose. The term "endocrine" is at any rate hardly likely to be superseded by "endocrinio," which Dr. Blair Bell "has been in the habit of using" in its place; for apart from the fact that it is damned with very faint praise by the author of its being, who himself considers it "a poor word," it suggests to a physiologist the antithesis of "epicritic," which Head and Rivers have employed in a totally different connexion.

As for the word "hormopoietic," which Dr. Blair Bell now proposes we shall adopt in place of "endocrinio," and regarding which he states that "the derivation is obvious and, he thinks, unassailable," a glance at a lexicon shows that this can only be derived from *ὅρμος*, a chain or cord, so that the internally secreting organs thus become either "chain-factories" or "rope-walks," which, as old Euclid used to say, is absurd!

Regarding the term "hormone," I have given the history of this at length in my book on the "Endocrine Organs," published last year. If Dr. Blair Bell had looked at this or had consulted the original papers referred to in it he would have avoided more than one error. Professor Starling, who coined the word, and who, as Dr. Blair Bell says, "is entitled to define his own term," has given a very precise definition of it<sup>1</sup>—viz: "By the term 'hormone' I understand *any substance* normally produced by the body and carried by the blood stream to distant parts which it affects for the good of the organism as a whole." He proceeds to give as examples of hormones, secretin, adrenalin, and carbonic acid.<sup>2</sup> I myself propose to use the word "hormone" in the wide sense employed by its inventor, although Dr. Blair Bell, following most authors, appears to wish to limit Professor Starling's definition to certain substances produced in definite organs.

As long ago as 1894 it was shown by the late Dr. George Oliver and myself that a specific organic substance is formed within the medulla of the suprarenal capsules which, when introduced into the blood, operates upon certain structures in the body in the same manner as drugs which are introduced from the outside; and, as a matter of fact, this very substance, which has been isolated, is now included in the Pharmacopoeia amongst other drugs. Since that time several other specific organic substances of like nature have been discovered, although no other has as yet been chemically isolated. Seeking for a convenient term to express such specific organic substances, whatever their action might be, and realising my own classical shortcomings, I consulted with my friend and colleague, the late Professor W. R. Hardie, than whom, I suppose, our generation has seen no more accomplished classical scholar. It was he who suggested the term "autacoid" (not autocoid, as Dr. Blair Bell is made to put it, owing, I trust, to a printer's error), derived from *άὐτος*, a remedy (whence also the term *panacea*, a universal remedy); and since this exactly expresses what is required—viz., a drug-like substance formed by the body itself—I adopted the term, defining an autacoid as a "specific organic substance formed by the cells of one organ and passed from them into the circulating fluid to produce effects upon other organs similar to those produced by drugs." But, like other drugs, autacoids either excite action or prevent action, and for clarity's sake it is not only convenient but necessary to have two words

expressive of these opposite effects. To express excitation I adopted Professor Starling's term "hormone," which was already in general use; to express prevention the term "chalone," from *χαλώω*, to make slack. Thus the autacoids, as well as other drugs, could be classed either as *hormonic* or *chaloneic* according as they excite activity or prevent it. To talk of provoking prevention, as Dr. Blair Bell proposes to do, is a contradiction in terms.

I may, I hope, be permitted to add without infringing the bounds set by modesty, that I have at least as good a right as Dr. Blair Bell to suggest an appropriate nomenclature for what is after all to some extent my own progeny.

I am, Sir, yours faithfully,  
University of Edinburgh, Jan. 9th, 1917. E. A. SCHÄFER.

## THE DIFFERENTIATION OF HEART MURMURS IN SOLDIERS.

*To the Editor of THE LANCET.*

SIR.—The remarks of Professor David Drummond in THE LANCET of Nov. 4th last regarding the influence of pressure upon the chest wall in altering the tone of cardiac murmurs suggest a comment upon the nature of such murmurs.

A systolic apical murmur in the days when I was a medical student was looked upon as an indication of grave cardiac trouble. We examined the heart carefully in cases of rheumatic fever, and the appearance of a murmur was virtually considered to justify condemnation of the patient, so far as health was concerned, for life. Yet the question arose how, if mitral regurgitation is occasioned by a deformity of the mitral valve which must take weeks or months to develop, can regurgitation be so quickly produced that a murmur may appear almost as soon as pain is complained of in the joints? Again, it was soon noticed that not only a mitral systolic murmur but also a pulmonary systolic murmur was often present. Then a paper by Dr. Arthur Foxwell appeared attributing a pulmonary systolic murmur to dilatation of the right side of the heart. Although Dr. Foxwell's explanation may not have been correct in every detail, it seemed to be reasonable, and probably his main contention true—namely, that the murmur is associated with dilatation of the right ventricle, chiefly in the neighbourhood of the conus arteriosus. Accepting Dr. Foxwell's explanation to be true, it was natural to conclude that if the pulmonary systolic murmur be due to dilatation of the right side of the heart, a mitral systolic murmur may also be due to dilatation of the left side of the heart. This view was strengthened by noticing how frequently a systolic apical murmur arising during rheumatism may disappear, and I wrote a short article in THE LANCET<sup>1</sup> which called forth a letter from Dr. D. B. Lees, saying that he was intending to publish observations which supported the view of dilatation of the heart occurring in acute rheumatism.

At that time it seemed reasonable to suppose—especially after meeting with definite cases of disease in the cardiac muscle in the post-mortem room, both in rheumatism and chorea—that the mitral systolic murmur was often due to dilatation of the heart allowing of mitral regurgitation. Yet it became evident, when looking up cases two to three years after a murmur had first been noted, that a mitral systolic murmur which had developed a harsh character before the patient first passed from under observation generally persisted, whereas a murmur described as lower-pitched more often than not disappeared. This gives rise to the question, What is the difference in causation of a low-pitched and of a high-pitched murmur? Can a systolic apical murmur be produced without the presence of regurgitation through the mitral orifice? Is it possible that the murmur may arise in the cardiac wall?

Professor David Drummond has recently commented upon the effect of pressure on the chest-wall upon cardiac murmurs, laying stress on the fact that many murmurs can be abolished by pressure. In my experience it is the low-pitched murmurs which are very materially affected, but I do not think are often completely abolished, by pressure. The lower tones disappear, but a residuum of higher tones of more blowing character may remain. We may assume that the higher-pitched tones possibly indicate some temporary leakage through the mitral valve. But how are the lower

<sup>1</sup> Proc. Roy. Soc. Med., 1914.

<sup>2</sup> The italics are mine.

<sup>1</sup> THE LANCET, 1896, II, 170.

tones which disappear produced? In one detail I misread the letter of Professor Drummond when I recently ventured to add a note on my experience regarding the effect of pressure upon the chest-wall on murmurs. Professor Drummond appears to consider that the murmurs which disappear are due to vibrations of the chest-wall. It is difficult quite to gather his meaning. The chest-wall being the medium which, through the stethoscope, conveys murmurs to our ears must vibrate in all cases, but neither with functional nor organic disease can murmurs, it seems to me, originate in the chest-wall. If we abolish a murmur by pressure upon the chest-wall we presumably arrest the onward progress of those vibrations which compose the murmur. In those murmurs which we do not abolish the vibrations are of a different nature, probably smaller and more rapid, and pressure fails materially to influence them. Earlier I have suggested whether it may be possible that a systolic murmur may arise in movements of the heart-wall. In this connexion it may be interesting to remark that so frequently are slight functional murmurs audible both over the pulmonary and mitral areas in very young children that it seems to me they may be regarded as physiological. In other words, cardiac action alters to some extent as age advances and some time may elapse before the cardiac sounds we are familiar with in adults become the fixed sounds of the heart. If we allow the view that some low-toned functional murmurs are produced by vibrations arising in unusual behaviour of the cardiac systole then perhaps we may consider some cases in which functional murmurs are heard to be a return to the comparatively unstable condition of early childhood.

Whatever view may be held with regard to the possibility of functional apical systolic murmurs arising in the wall of the heart, in cases where a diastolic sound is audible between the first and second sound we have definite evidence of some abnormal cardiac action. An additional shock to that of the impulse can often be felt by the hand, and when the heart is diseased and much hypertrophied the abnormal impulse may, in rare instances, give a tracing in which the wave it indicates, though more transitory, may equal the wave of the systole in height. We are, however, speaking more particularly of hearts in which there is no disease. In them, although it is not so easy to obtain a graphic record of abnormal cardiac action, the same action is very commonly present. It may persist for days or weeks or be present at one moment and absent at another. The point, however, on which I wish to lay stress is that a diastolic sound occurring between the first and second sounds is associated with some abnormal cardiac action. This action may be an exaggeration of a physiological action. The frequency of its presence in children supports such a view. But the action, when present in a marked degree, is abnormal as far as the adult is concerned. The sound which appears in association with the abnormal action must also be regarded an abnormal, but as a rule is of no serious import. Yet I have known it frequently to be mistaken by well-qualified men for a pre-systolic murmur, and the subject of it to be diagnosed as a sufferer from mitral stenosis. The sound itself, however, need in no way be connected with valvular disease, and in most instances is merely an indication of some passing phase of cardiac action.

To sum up the foregoing remarks, it may be said that so-called functional murmurs are, as a rule, lower in tone than those having an organic origin. They are more materially affected by pressure. Although in the case of apical murmurs some temporary leakage of the mitral valve may be present, the question arises whether that portion of the murmur which can be readily abolished by pressure may not be due to vibrations associated with an abnormal cardiac systole. In favour of this view is the fact that in association with a dia-tolic sound, occurring between the first and second sounds, there is obviously an unusual action of the heart, which in most instances, being transitory, must be described as functional.

Since writing the above an observation, I believe of Sir Wm. Broadbent, has occurred to me, which may be worthy of note at the present time when so many soldiers who have undergone severe physical exertion are under medical supervision. Sir Wm. Broadbent, so far as I remember (I quote from memory), without referring to the theory of Dr. Foxwell concerning the method of production of the pulmonary systolic murmur, stated that he had met

with cases in which healthy young men manifested pulmonary systolic murmur after prolonged physical exertion, such as mountain climbing. It would be interesting if this observation should be confirmed. It may be added also in connexion with the effect of pressure upon cardiac murmurs that I believe my attention was first drawn to the fact by a paper published by Dr. Sydney Ringer and Dr. A. G. Phear many years ago. Dr. Moxon once said that the "art of originality is the art of forgetting." There may occasionally be experiences with which one becomes so familiar that one forgets whether they first impressed themselves upon one's mind in virtue of their own force or whether some other observer has drawn one's attention to them.

I am, Sir, yours faithfully,

THEODORE FISHER, M.D. Lond.

### STAPHYLOCOCCUS MENINGITIS.

*To the Editor of THE LANCET.*

SIR.—The diagnosis of the case described as staphylococcus meningitis by Dr. H. Bourges in your issue of Jan. 6th (p. 28) would appear likely to be at least doubtful. Contamination by *Staphylococcus albus* in my experience in lumbar puncture, however carefully the skin is prepared is fairly frequent, both in cases where the meningococcus is found and where it is not found. Gram-positive cocci in any turpentine abscess of some duration would not be uncommon. Authorities agree that many cases of cerebro-spinal fever occur where the causative organism which is very elusive is not found. The description of the case and the fact that the patient recovered makes it likely to be one of cerebro-spinal fever rather than one of staphylococcus meningitis.

In reference to this contamination you published a few issues back the description of a puncture needle specially designed to obviate its contamination by the operator's fingers. I find a simpler method is to flame the head of the needle after puncture and before withdrawing the stilette to collect the fluid.—I am, Sir, yours faithfully,

SHEFFIELD NEAVE,  
Temporary Captain, R.A.M.C.  
Military Laboratory for Cerebro-spinal Fever, Ipswich,  
Jan. 7th, 1917.

### A NEW CULTURE MEDIUM FOR THE MENINGOCOCCUS.

*To the Editor of THE LANCET.*

SIR.—In a recent investigation into the anti-coagulating action of acid aniline dyes on proteins, Holland<sup>1</sup> found that blood serum could be heated to high temperatures with these dyes without undergoing coagulation. He stated that blood serum, to which was added half its volume of a 2 per cent. solution of Congo red, set to a clear jelly after sterilisation at 120° C., and could be used as a culture medium for bacteria. This fact appeared to the writer, who had been doing much culture work with the meningococcus, to offer an easily prepared medium upon which that organism could be grown readily, and which could be used for plate cultures. Accordingly, sloped tubes of the Congo red serum were prepared in the inspissator, and it was found that the medium was transparent, at any rate, in the upper portion of the slope, although in the lower portion the colour was somewhat too dense to be accurately described as absolutely transparent. The top thin part of the slope was inclined to become hard. Stroke cultures of meningococcus on the new medium grew well, and discrete red colonies were plainly visible in the upper part of the stroke when examined with a lens through the medium. The viability of the organism in these cultures was quite good, subcultures being obtained after two to three weeks. The cultures also yielded the characteristic sugar reactions of the organism.

Plates of the new medium were prepared by pouring the liquid mixture into the plate and sterilising at 120° C. for 20 minutes. There being a considerable amount of expressed water, it was found inadvisable to use the inverted position for drying off the plates. The surface of the medium was somewhat soft, but it was quite transparent, and colonies could readily be examined under the microscope. An opportunity has not yet arisen for using these plates for obtaining

<sup>1</sup> Comptes Rendus, vol. cixii., p. 959.

cultures from throat swabs, but it is possible that plates of this medium might form a useful separation method for direct cultures from the throats of meningococcal contacts. In passing, it may be mentioned that the *B. diphtheriae* grows well on the new medium.

In connexion with the keeping of laboratory cultures of the meningococcus on serum agar and ascitic fluid media, the necessity for frequent subcultivation is well known. The claims of ordinary blood serum for this purpose would appear to have been somewhat overlooked. It has been found that Loeffler's serum forms a medium on which the meningococcus is long-lived. On more than one occasion the coccus has been found to be alive in cultures one month old. Either the new Congo red serum or Loeffler's serum is recommended for laboratory cultures of meningococcus, the tubes being kept in the incubator and subcultures made every fortnight.—I am, Sir, yours faithfully,

J. H. JOHNSTON, M.Sc.

Arundel-street, Strand, W.C., Jan. 6th, 1917.

### THE HOT-AIR OVEN AS AN INSPISSATOR.

To the Editor of THE LANCET.

SIR,—In the absence of an inspissator in the bacteriological laboratory I have found that the hot-air oven can be utilised as such to far greater advantage than with the water-bath, the inspissator's usual substitute. Two pieces of glass rod calculated to give the required slope to the serum in the test-tubes are fixed by means of plasticine to a sheet of asbestos, the tubes of serum laid across each rod, and the whole placed in the oven. The purpose of the asbestos is to prevent any charring which might occur if the tubes were placed on the floor of the oven without any protection owing to the proximity of the Bunsen heater. I have found inspissation for 30 minutes at 80° C. ample in the majority of cases by the above method.

The great advantages of this technique are that it is a great deal quicker than with the water-bath, and the dimensions of the hot-air oven being generally in excess of those of the former a greater number of tubes can be inspissated at one time.

I am, Sir, yours faithfully,

E. L. COOPER,

Jan. 1st, 1917. Bacteriologist, No. 14 Mobile Field Laboratory.

UNIVERSITY OF EDINBURGH.—We have received from the secretary of the Senate the annual report for 1916, containing the following items of medical interest. The total number of matriculated students during the year was 1741, of whom 1060 were men and 681 were women. Of these, 941 (including 238 women) were enrolled in the Faculty of Medicine. Of the students of medicine, 446 belonged to Scotland, 143 were from England and Wales, 34 from Ireland, 79 from India, 216 from British colonies and dependencies, and 23 from foreign countries. The number of medical students from the colonies and dependencies was 23 in excess of the number for 1915, South Africa accounting fully for the increase. The following medical degrees were conferred during 1916: Bachelor of Medicine and Master in Surgery (M.B., C.M.), 1; Bachelor of Medicine and Bachelor of Surgery (M.B., Ch.B.), 128; Doctor of Medicine (M.D.), 18. The total annual value of the University fellowships, scholarships, bursaries, and prizes in the Faculty of Medicine now amounts to £5565. Women students of medicine, who formerly received their education in extra-mural classes, have been admitted to University courses in all the subjects of the medical curriculum. An Ordinance is being promoted for the foundation of a chair in tuberculosis, funds amounting to £18,000 having been transferred for this purpose to the University Court by the Royal Victoria Hospital Tuberculosis Trust. Additional lecturers have been appointed in the Faculty of Medicine as follows: in pathology, Dr. James Miller; in materia medica, Dr. John Orr; in midwifery, Dr. J. W. Ballantyne. Mr. J. W. Dowden has succeeded Mr. C. W. Cathcart as one of the senior lecturers in clinical surgery. On Feb. 15th the death occurred of the venerable Principal, Sir William Turner, at the age of 84. His active association with the University—as demonstrator in anatomy, as professor of anatomy, and as Principal—extended over 62 years. The vacancy in the Principalsip was filled up by the appointment, in May, of Sir J. Alfred Ewing, Director of Naval Education at the Admiralty.

### The War.

#### THE CASUALTY LIST.

The following names of medical officers appear among the casualties announced since our last issue:—

##### Died.

Lieut.-Col. R. C. McLeod, Canadian Army Medical Corps, was a student at New York University Medical College, and was licensed in 1891. Before joining the Canadian Contingent he was in practice at North Sydney, Nova Scotia.

##### Wounded.

Capt. C. E. Whitehead, R.A.M.C.

Capt. J. H. Askins, R.A.M.C.

Capt. T. P. Cole, R.A.M.C., attached Royal Field Artillery.

Lieut. D. Campbell, R.A.M.C.

#### DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

Capt. and Flight-Commander J. W. W. Nason, Royal Sussex Regiment, and Royal Flying Corps, younger son of the late Dr. C. St. S. R. Nason, of Corse Grange, Gloucester. Second Lieut. R. N. Heathcote, East Yorkshire Regiment, only surviving son of Dr. R. Heathcote, West Didsbury, Manchester.

Second Lieut. W. D. Semple, King's Royal Rifle Corps, eldest son of Col. Sir D. Semple, Director-General, Public Health Department, Egypt.

#### MENTIONED IN DESPATCHES.

The names of the following officers of the medical services, whose "distinguished and gallant services and devotion to duty" he considers are deserving of special mention, are included in the recent despatch from Field Marshal Sir Douglas Haig, G.C.B., Commander-in-Chief of the British Armies in France:—

##### STAFF.

Black, Maj. R. B., R.A.M.C., Res. of Off.

Burtschell, Col. C. H., C.M.G.

Macpherson, Surg.-Gen. W. G., C.B., C.M.G., Hon. Phys. to the King.

Sloggett, Lt.-Gen. Sir A. T., K.C.B., C.M.G., Hon. Surg. to the King.

#### ROYAL FIELD ARTILLERY.

Bailey, Surg.-Maj. F. W., D.S.O.

Peck, Surg.-Maj. E. G.

#### ARMY MEDICAL SERVICE.

Alexander, Lt.-Col. (temp. Col.) J. D., R.A.M.C.

Barefoot, Col. G. H., C.M.G.; Bewley, Col. A. W.; Blackham, Lt.-Col. (temp. Col.) R. J., C.I.E., R.A.M.C.; Bliss, Lt.-Col. (temp. Col.) H. W., R.A.M.C.; Bowen, Lt.-Col. (temp. Col.) A. W. N., R.A.M.C.; Brazier-Creagh, Lt.-Col. (temp. Col.) G. W., C.M.G., ret. pay; Browne, Col. E. G. C., Browne, Maj. C. G., D.S.O., R.A.M.C.; Buswell, Lt.-Col. (temp. Col.) F. R., R.A.M.C.

Chopping, Lt.-Col. A., C.M.G., R.A.M.C.; Conway, Maj. J. M. H., R.A.M.C.; Cree, Col. G., C.M.G.

De Wesselow, Temp. Capt. O. L. V.; Daly, Col. T.; Dowsett, Lt.-Col. (temp. Col.) E. B., R.A.M.C.

Emerson, Maj. H. H. A., R.A.M.C.; Ensor, Bt. Col. and Lt.-Col. (temp. Col.) H., D.S.O., R.A.M.C.; Evans, Lt.-Col. (temp. Col.) P., C.M.G., R.A.M.C.

Fawcett, Lt.-Col. H. B., C.M.G., R.A.M.C.; Ferguson, Lt.-Col. (temp. Col.) J. D., D.S.O.; Furnivall, Maj. C. H., R.A.M.C.

Garrard, Col. J. J.; Gray, Col. W. L.; Greig, Lt.-Col. (temp. Col.) F. J., Res. of Off.

Harty, Maj. (temp. Lt.-Col.) T. E., R.A.M.C.; Hime, Lt.-Col. H. C. R., R.A.M.C.; Hinge, Lt.-Col. (temp. Col.) H. A., C.M.G., R.A.M.C.; Hooper, Lt.-Col. (temp. Col.) A. W., C.M.G., D.S.O.

Ievers, Maj. O., R.A.M.C.; Irwin, Col. (temp. Surg.-Gen.) J. M., Logar, Capt. D. D., R.A.M.C.; Luther, Col. A. J.

Macdonald, Col. S., C.M.G.; Macleod, Col. R. L. B.; Martin, Maj. C. J., R.A.M.C.; Martin, Maj. J. F., C.M.G., R.A.M.C.; Maughan, Maj. J. St. A., R.A.M.C.; Millar, Maj. C. R., R.A.M.C.; Morgan, Col. F. J.

Newland, Col. F. R.; O'Keefe, Surg.-Gen. M. W., C.B.

Pike, Col. (temp. Surg.-Gen.) W. W., C.M.G., D.S.O.; Pocock, Col. H. I.; Poe, Lt.-Col. (temp. Col.) J., D.S.O., R.A.M.C.; Pollock, Lt.-Col. (temp. Col.) C. B., R.A.M.C.; Profet, Lt.-Col. (temp. Col.) C. W., R.A.M.C.; Prynne, Lt.-Col. (temp. Col.) H. V., R.A.M.C.; Purser, Maj. L. M.

Roch, Lt.-Col. H. S., R.A.M.C.; Ryan, Maj. (temp. Lt.-Col.) B., D.S.O.

Scott, Col. B. H.; Scott, Temp. Capt. B., R.A.M.C.; Scott, Capt. T. H., M.C., R.A.M.C.; Shanahan, Lt.-Col. (temp. Col.) D. D., R.A.M.C.; Sheehan, Maj. G. F., R.A.M.C.; Sherren, Maj. H. G., R.A.M.C.; Silver, Lt.-Col. (temp. Col.) J. P., R.A.M.C.; Skinner, Col. B. M., C.M.G., M.V.O.; Slayter, Lt.-Col. (temp. Col.) B. W., C.M.G., R.A.M.C.; Symons, Lt.-Col. (temp. Col.) F. A., D.S.O., R.A.M.C.

Thomson, Maj. C. G.; Thomson, Col. J.; Thurston, Col. H. S., C.M.G., R.A.M.C.; Thurston, Maj. L. V., R.A.M.C.  
Whaite, Col. T. du B.; Woodley, Maj. R. N., R.A.M.C.; Wright, Col. R. W.

## CONSULTANTS.

Bowlby, Lt.-Col. (temp. Surg.-Gen.) Sir A. A., Knt., K.C.M.G., K.C.V.O., 1st Lond. Gen. Hosp., R.A.M.C.  
Fowler, Lt.-Col. (temp. Col.) Sir J. K., K.C.V.O., 3rd Lond. Gen. Hosp., R.A.M.C.  
Galloway, Maj. (temp. Col.) J., 4th Lond. Gen. Hosp., R.A.M.C.  
Gray, Maj. (temp. Col.) H. McL. W., C.B., 1st Scottish Gen. Hosp., R.A.M.C.  
Herringham, Lt.-Col. (temp. Col.) Sir W. P., Knt., C.B., 1st Lond. Gen. Hosp., R.A.M.C.  
Holmes, Temp. Lt.-Col. G. M.  
Eighty, Capt. (temp. Col.) H. M., 2nd Lond. Gen. Hosp., R.A.M.C.  
Sargent, Temp. Col. P. W. G., R.A.M.C.  
Sinclair, Temp. Col. T.  
Smith, Capt. (temp. Col.) S. M., 3rd Lond. Gen. Hosp., R.A.M.C.

## ROYAL ARMY MEDICAL CORPS.

Abraham, Temp. Capt. E. C.; Aldis, Temp. Capt. C.; Alexander, Capt. H. S. A., Spec. Res.; Anderson, Temp. Capt. J.; Armitage, Capt. F. R.; Armstrong, Maj. W. B.  
Bawtington, Lt.-Col. M. H.; Barron, Capt. D. C. (temp. Maj., coming. Fd. Am.) Barnes, Temp. Capt. G. A.; Bayley, Capt. J. H., Spec. Res.; Beaumont, Capt. (temp. Maj.) W. K.; Bevan, Capt. F. A., M.C., Spec. Res.; Bennett, Maj. (temp. Lt.-Col.) W.; Benson, Temp. Lt.-Col. W. A.; Biggs, Capt. K., Spec. Res.; Bird, Maj. (temp. Lt.-Col.) B. B.; Burdill, Temp. Capt. L. G., D.S.O., M.C.; Boyce, Capt. W. W.; Bradish, Capt. (temp. Maj.) F. L.; Brebner, Capt. (temp. Maj.) C. S.; Broughton, Temp. Capt. N. W., D.S.O. (killed); Brunskill, Maj. (temp. Lt.-Col.) J. H.; Bryden, Maj. (temp. Lt.-Col.) R. A.; Buckley, Capt. C. D. M., Spec. Res.

Calver, Capt. H. M.; Campbell, Capt. W. K., D.S.O., Spec. Res.; Carruthers, Capt. W. D.; Carson, Temp. Capt. F.; Chambers, Temp. Capt. W. D.; Charles, Temp. Capt. R.; Clarke, Capt. H. M.; Clayton, Capt. J.; Clayton, Lt.-Col. W. K.; Clements, Lt.-Col. R. W.; Cockill, Lt.-Col. W. B.; Collinson, Lt.-Col. H.; Conway, Temp. Capt. J. A.; Copland, Temp. Capt. M.; Corriner, Maj. (temp. Lt.-Col.) R. H. L.; Craig, Temp. Capt. J.; Cunningham, Temp. Capt. E. C.; Davidson, Maj. (temp. Lt.-Col.) H. A.; Davison, Capt. W. H.; Day, Temp. Capt. H. B.; Demetriadi, Maj. (temp. Lt.-Col.) L. P.; Dennis, Capt. A. W.; Dennis, Maj. B. R.; Dive, Capt. (temp. Maj.) G. H.; Dixon, Capt. M.; Donovan, Capt. C. O.; Dunbar, Lt.-Col. B. H. V.; Dunkerton, Maj. (temp. Lt.-Col.) N. H.; Dunn, Lt.-Col. (temp. Col.) H. N.

Edwards, Capt. (temp. Maj.) G. B.; Eisner, Lt.-Col. O. W. A.; Ellis, Capt. F.; Emerson, Temp. Capt. H.

Fawcett, Maj. (temp. Lt.-Col.) H. H. J.; Ferguson, Capt. G. D.; Ferguson, Capt. N. M.; Fitzgerald, Lt.-Col. P. G.; Fitzmaurice-Kelly, Temp. Capt. M.; Foster, Capt. F. G., Spec. Res.; Fotheringham, Capt. W., Spec. Res.; Fuhr, Lt.-Col. R. S. H., D.S.O.

Galpin, Capt. P. A.; Gask, Maj. G. B.; Gill, Lt.-Col. J. G.; Gilnour, Lt. W. N.; Gimson, Capt. E. C., D.S.O.; Goddard, Lt.-Col. G. H.; Goodwin, Lt.-Col. T. H. J. C., C.M.G., D.S.O.; Goodwin, Maj. (temp. Lt.-Col.) W. R. P.; Graham, Capt. N. F.; Gravett, Temp. Capt. J. C. B.; Green, Capt. (temp. Maj.) T. A.; Griffiths, Temp. Capt. H. E.

Hacker, Capt. C. F., Spec. Res.; Haddon, Capt. D. A. R.; Halg, Maj. W.; Harding, Maj. (temp. Lt.-Col.) D. L., D.S.O.; Hardy, Temp. Capt. G. F.; Hart, Temp. Lt. A. P.; Harvey, Maj. (temp. Lt.-Col.) W. J. S.; Hawthorn, Lt.-Col. F.; Hewetson, Lt.-Col. H.; Hill, Temp. Capt. R. McC., D.S.O.; Hodder, Maj. (temp. Lt.-Col.) A. E.; Howell, Capt. F. D. G., M.C.; Hudleston, Lt.-Col. W. H.; Hughes, Temp. Lt. H. L. G., D.S.O.; Hughes, Capt. L. B.; Hunt, Maj. (temp. Lt.-Col.) R. N.; Hunter, Temp. Capt. A.; Hunter, Temp. Capt. D. W., D.S.O.; Hurst, Temp. Capt. J. T.; Hyde, Maj. (temp. Lt.-Col.) D. O.

Ingram, Temp. Capt. T. L., D.S.O., M.C. (killed); Inkson, Lt.-Col. B. T., V.C.; Irvine, Maj. (temp. Lt.-Col.) A. H. S., D.S.O.

Jacobs, Capt. C.; John, Capt. D. W., Spec. Res.; Johnston, Temp. Capt. J. G.; Jones, Temp. Lt. D. S.

Kavanagh, Capt. E. J., M.C.; Keay, Temp. Capt. A. C.; Kelly, Maj. (temp. Lt.-Col.) H. B.; Kendrew, Capt. A. J., M.C.; Khoz, Maj. (temp. Lt.-Col.) B. B.

Lane, Capt. H. D.; Langstaff, Lt.-Col. J. W.; Lawson, Capt. J., Spec. Res.; Ligertwood, Temp. Maj. (temp. Lt.-Col.) C. E.; Lightstone, Capt. H.; Lilley, Capt. C. H.; Litchfield, Temp. Lt. E. M.; Lucas, Capt. H. A.

Macfadyen, Capt. D., Spec. Res.; Macfarlane, Temp. Lt. N. (since relinquished his commission); Macintyre, Temp. Capt. H. R.; Mackenzie, Capt. (temp. Maj.) D. F.; MacKenzie, Temp. Capt. J. T. (since relinquished his commission); Mackie, Capt. (temp. Maj.) G.; Mackinnon, Maj. (temp. Lt.-Col.) J.; Magill, Temp. Maj. R.; Mahoney, Maj. M. J. D.S.O., T.D.; Mainprise, Lt.-Col. C. W.; Maitland-Jones, Capt. A. G.; Manford, Capt. J. S. R.; Marshall, Capt. J. D.; Mavety, Temp. Capt. A. F.; Meadows, Maj. S. M. W.; Michell, Temp. Capt. R. W.; Miller, Capt. R. M.; Miller, Capt. T. M., M.C., Spec. Res.; Miller, Capt. W. A., D.S.O., Spec. Res.; Milne, Capt. J. E., D.S.O.; Montgomery-Smith, Maj. (temp. Lt.-Col.) E. C.; Moore, Maj. (temp. Lt.-Col.) E. H. M.; Moore, Capt. H.; Moriarty, Maj. T. B.; Morphew, Lt.-Col. E. M.; Morris, Capt. C. R. M.; Mulholland, Capt. H. G.; Mumford, Temp. Capt. W. G.; Murchison, Capt. (temp. Maj.) K. D.

Noble, Capt. T. P.; Norman, Lt.-Col. H. H.

Osborn, Maj. (temp. Lt.-Col.) A. C., D.S.O.

Parker, Temp. Capt. W. N.; Parry, Temp. Capt. W. H.; Percival, Capt. E., D.S.O.; Picken, Capt. A.; Pierse, Temp. Lt. J. A.; Pike, Capt. E. B.; Potter, Temp. Lt. S.; Potter, Maj. T. J.; Purdon, Capt. (temp. Maj.) W. B., M.C.

Quinn, Capt. J. P., Spec. Res.

Rafter, Capt. J.; Ranson, Lt.-Col. W.; Ray, Maj. (temp. Lt.-Col.) M. B.; Headlie, Temp. Capt. A. F.; Riddel, Capt. D. O.; Ritchie, Maj. (temp. Lt.-Col.) T. F.; Robertson, Temp. Capt. G. D.; Robertson, Capt. W. L.; Robinson, Temp. Capt. H. H., D.S.O.; Robinson, Capt. (temp. Maj.) T. T. H.; Rose, Maj. (temp. Lt.-Col.) A. M.; Rothwell, Temp. Capt. T. A.; Rowlett, Temp. Lt. L. M.; Rudkin, Temp. Capt. G. W. R.

Sayres, Maj. (temp. Lt.-Col.), A. W. F.; Scott, Capt. G.; Scott, Capt. R. L.; Scott, Capt. R. S.; Seely, Temp. Capt. E.; Selby, Capt. B. J.,

Sharp, Lt.-Col. (temp. Col.) A. D., C.M.G.; Shea, Surg.-Maj. A. W.; Sheridan, Capt. B. C. O.; Simpson, Capt. G. C. E.; Smalley, Capt. A. A., Spec. Res.; Smooth, Maj. (temp. Lt.-Col.) H. G.; Smith, Capt. C. N.; Smith, Capt. G. F. R.; Stephenson, Capt. J.; Stewart, Maj. (temp. Lt.-Col.) H. M. C.; Stockdale, Capt. G. V., Spec. Res.; Stutford, Temp. Lt. W. J. B.; Summerhayes, Maj. J. O.; Svenson, Lt. B. E.; Taylor, Capt. L. W. O., Spec. Res.; Teggart, Temp. Capt. J. O. T.; Terry, Temp. Capt. L. H.; Thompson, Lt. Col. A. G.; Thompson, Capt. J. E. G.; Thopson, Maj. (temp. Lt.-Col.) R. J. C., D.S.O.; Turner, Maj. (temp. Lt.-Col.) P.

Upcott, Temp. Capt. H.

Vey, Capt. D. C.

Walker, Temp. Maj. (temp. Lt.-Col.) A. N. (killed); Walker, Temp. Capt. H.; Wallis, Lt. M. J. T.; Warburton, Capt. J. R. N., Spec. Res.

Watkins-Williams, Temp. Capt. P. L., D.S.O.; Watson, Lt.-Col. A. A., Spec. Res.; Watts, Lt.-Col. (temp. Col.) B.; Wigmore, Capt. J. B. A.; Wiley, Maj. W.; Wilmot, Maj. R. C.; Wilson, Capt. A.; Wilson, Capt. G. E. C.; Wilson, Temp. Capt. H. B.; Winter, Maj. (temp. Lt.-Col.) M. G.; Wingate, Maj. (temp. Lt.-Col.) B. F.; Wood, Maj. (temp. Lt.-Col.) J.; Wright, Capt. (temp. Maj.) W. G.

Yates, Temp. Capt. G. D.; Young, Capt. W. H.

## ROYAL NAVAL DIVISION MEDICAL UNIT.

Stanford, Staff-Surg. C. H. C.

## ARMY VETERINARY CORPS.

Anderson, Temp. Capt. W.

## AUSTRALIAN ARMY MEDICAL CORPS.

Anderson, Maj. J. H.; Bailey, Capt. G. B.; Barber, Col. G. W.; Butler, Maj. A. G., D.S.O.; Butler, Lt.-Col. H. N.; Byrne, Maj. G. C.; Cattford, Capt. H. R.; Davis, Maj. J. H. M. C.; Embleton, Capt. D.; Fry, Maj. H. K.; Hardy, Lt.-Col. (temp. Col.) C. H. W., V.D.; Hearne, Lt.-Col. W. R. B.; Henderson, Capt. R. L.; Horn, Lt.-Col. A.; Huxtable, Lt.-Col. R. B.; Jeffries, Maj. L. W.; Lewers, Maj. H. B.; Marks, Maj. A. H.; McGregor, Maj. R. S.; McLennan, Capt. S.; Mattel, Maj. C.; Meikle, Lt.-Col. A. J. A.; Phipps, Lt. Col. J. H.; Plant, Capt. H. F. H.; Powell, Capt. A. H.; Ross, Lt.-Col. T. G.; Savage, Capt. V. W.; Shaw, Lt.-Col. G. C.; Smith, Capt. A. C.; Sturdee, Lt.-Col. (temp. Col.) A. H., C.M.G., V.D.; Sutton, Col. A.; Wall, Capt. F. L.; Welch, Maj. J. B. St. V.; Winn, Capt. R. C.; Woollard, Capt. (temp. Maj.) H. H.

## CANADIAN ARMY MEDICAL CORPS.

Barton, Capt. N. J.; Birkett, Col. H. S.; Blanchard, Lt.-Col. R. J.; Blaylock, Maj. E. H.; Burnett, Maj. P.; Foster, Col. G. LaF., C.B.; Hardisty, Capt. R. H. M.; Hardy, Lt.-Col. B. B.; Harris, Maj. L. C.; Hart, Capt. H.; Jacques, Lt.-Col. H. M.; Macdonald, Capt. R. St. J.; Peters, Lt.-Col. C. A.; Robertson, Capt. D. E.; Ross, Col. A. B., C.M.G.; Ross, Capt. S. G.; Scott, Capt. W. H.; Snell, Maj. (temp. Col.) A. B.; Walsh, Capt. J. P.; Webster, Lt.-Col. W.; Wright, Lt.-Col. R. P.; Young, Lt.-Col. T. W. H.

## NEW ZEALAND MEDICAL CORPS.

Begg, Col. C. M., C.M.G.; Bogle, Capt. G. V. (killed); Carbery, Maj. A. R. D.; Murray, Lt.-Col. D. N. W.

## SOUTH AFRICAN CONTINGENT.

Lawrie, Temp. Capt. M. B.; Pringle, Temp. Maj. R. N.; Welsh, Temp. Capt. T.

## INDIAN MEDICAL SERVICE.

Manifold, Col. C. C., C.B.

## THE EMPLOYMENT OF AMERICAN DOCTORS.

Publicity has recently been given in the daily press to the statement that young American doctors have volunteered their services and will be freely substituted for British doctors in the hospitals of this country in order to set free the present medical officers of military age for active service abroad. A recent statement in an American journal that the Director-General of our Army Medical Service had asked for the supply of a hundred or more young American doctors has, we believe, not been contradicted, and may therefore be taken as the policy of the Army Medical Department. To them will be allotted posts in military hospitals in this country which they can fill without possessing either a commission or a qualification registrable here. A corresponding number of British doctors of military age holding commissions will thus be set free. So far, then, as military occupation goes, the accounts in the daily press have been based upon fact, if misleading in detail. As regards civilian practice, as far as we know, the question of the employment of American doctors has not arisen in any practical form. The legal obligations of the civilian practitioner, both in hospital and private practice, prevent the employment here of those whose names do not appear on the British Medical Register. So long as the present absence of reciprocity between the United States and this country in medical matters remains unrectified, registration implies the obtaining in this country of a medical diploma recognised by the General Medical Council.

## NEW RED CROSS HOSPITAL FOR GLOUCESTER.—

The Bishop of Gloucester's Palace at Gloucester has been fitted up as a Red Cross hospital. It will accommodate 100 patients, contains an X ray apparatus, and a complete electrical massage installation.

## OBITUARY OF THE WAR.

NORMAN ERNEST JASPER HARDING, M.B.,  
CH.B. EDIN.,  
MAJOR, ROYAL ARMY MEDICAL CORPS.

Major N. E. J. Harding, who died of cholera at Colaba Military Hospital on August 10th last while in command of a stationary hospital at Bombay, was 41 years of age. He studied at Edinburgh and at University College,



Liverpool, graduating in medicine at Edinburgh University in 1900, and entering the Royal Army Medical Corps a year later, after taking a diploma in Public Health. He obtained his captaincy in 1906, and his majority in 1914. He was seriously wounded in the Boer War, and for his services at that time was decorated with the Queen's medal with two clasps and the King's medal. He went to France with No. 12 General Hospital on the outbreak of war, and served there for 15

months, before taking to India the unit which he was commanding at the time of his death. Previously to the outbreak of war he had served in Burma and on the West Coast of Africa. He contributed an article on the Value of Koch's Treatment of Malaria, to the *Journal of the Royal Army Medical Corps*, and other articles of a historical and professional character.

In 1908 Major Harding married Dorothy, oldest daughter of the late Ernest Wetton, of Maidstone, and of Kobe, Japan.

ROGER FORREST HUGHES, B.A., M.B., CH.M. SYDNEY,  
CAPTAIN, AUSTRALIAN ARMY MEDICAL CORPS.

Captain R. F. Hughes, who was killed on active service on Dec. 11th last, was 26 years of age and the elder son of Sir Thomas Hughes, who was for many years Lord Mayor of Sydney. He was educated at St. Ignatius College, Sydney, entering the Sydney University, where he first graduated in arts, and obtained his medical qualifications at the end

of 1915. He then filled the position of resident medical officer at St. Vincent's Hospital until March, 1916, when he enlisted in the Australian Army Medical Corps. After serving for six months at a base military hospital in Sydney he was detailed for service as regimental medical officer to an Australian battalion in France, arriving there early in December. Ten days later while dressing a wounded man in his advanced station he was severely wounded and died the same

day. Captain Hughes was well known in athletic circles in Sydney. He represented his school at cricket and football and his university at hockey. Just prior to leaving Australia he married Eileen, youngest daughter of M. E. Maher, of Collaroy Station, Merriwa, N.S.W., with whom and his parents much sympathy will be felt for his untimely death at the outset of a promising career.

CHARLES KENNETH MCKERROW, M.A., M.B.,  
B.C. CAMB.,  
CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain C. K. McKerrow, who died of wounds received the same day, on Dec. 20th last, at the age of 33, was elder son of the late Dr. George McKerrow, of Ayr. He was educated at Cargilfield and Charterhouse Schools, gaining from the latter the Science Scholarship of his year for Cambridge, and later an open scholarship at Clare College. He took a first class in science, graduated M.B. and B.C. in 1908, obtaining in the same year the diploma of the Conjoint Board. After holding resident posts at St. George's Hospital and being extern to the 1st Frauenklinik in Vienna, he joined his father in practice in Ayr for some years. On obtaining a commission in the R.A.M.C. in June, 1915, he was appointed regimental medical officer to a battalion of Northumberland Fusiliers, going with them to France, where he remained until his death.

Captain McKerrow was not one-sided in his development. At school and later he had some reputation as a middle-weight boxer, and he also played Association football for his college. His superior officer writes of him: "A few days before his death Captain McKerrow read an excellent paper on Trench Fever before our Divisional Medical Society, giving proof of his careful clinical work even in the trenches. I formed a very high opinion of him both as a gallant soldier and a skilful surgeon. He was absolutely fearless in the performance of his duty."

In January, 1915, Captain McKerrow married Jean, only daughter of the late James Craik, and leaves a widow and one son.

CLIFFORD CRAWSHAW PICKLES, M.R.C.S. ENG.,  
D.P.H. LEEDS,  
LATE CAPTAIN, ROYAL ARMY MEDICAL CORPS (T.F.).

Mr. C. C. Pickles, who died on Dec. 22nd last, after being invalidated out of the Royal Army Medical Corps, was 30 years of age, and the third son of Dr. J. J. Pickles, of Camp-road, Leeds, of whose six sons five were members of the medical profession and one a student before the war. Educated at the Leeds Grammar School, Clifford Pickles entered the School of Medicine at the University of Leeds, obtaining in 1909 the Conjoint Board qualification, and two years later the Public Health diploma of his University. After holding resident appointments at Leeds and acting as assistant in general practice at Harrogate and Ossett he was appointed

medical inspector of school children under the North Riding Education Committee and was stationed at Malton, where he was also in charge of the local company of the 5th Yorkshire Territorials. At the outbreak of hostilities he was medical officer at Gateforth Sanatorium, near Selby, and on mobilisation served with the 5th Yorkshire Regiment at home for some months, after which he was transferred to the medical service as a captain. He went out to France in



April, 1915, in charge of a clearing station, came home three months later with severe shell shock, and was invalided out of the service in October, 1915. In spite of his poor health he then took over the practice at Earby of his brother, the late Surgeon P. D. Pickles, who died of gas poisoning after going down with H.M.S. *Russell* in the Mediterranean last year. Unfortunately, his health did not improve, and an attack of broncho-pneumonia following influenza proved fatal.

Captain C. C. Pickles's service to his country was undertaken with no thought of himself. His transference from combatant to medical service was made at a time when doctors were urgently required for the Army, and the strain of his work contributed to the illness from which he never quite recovered. His record and that of his family are a notable achievement. Captain Pickles married in June of last year Dorothy B. E. Wilkinson, only daughter of Charles Wilkinson, of Boston Spa and Leeds.

#### THE FIRST BRITISH RED CROSS UNIT IN ITALY.

We have received from Dr. G. S. Brock, chief medical officer to the unit, a report of the first year's hospital work drawn up for the Joint War Committee, from which we take the following :—

Villa Trento, the headquarters of the ambulance unit, is on the high road beyond the bridge over the river Natisone at Manzanol, and within a dozen miles of the fighting on the Isonzo front, on Monte Sabotinò, at Oslavia, and on Monte Podgora. The villa is a large building of seventeenth century design, belonging to the Conte di Trento, with a central portion of three storeys and wings of two storeys, flanked on either side by tall pine trees. Behind the latter, on one hand, is a line of offices occupied by a detachment of Carabinieri, while on the other is a long building of which the upper storey, ordinarily used as a granary, now forms an important part of the hospital. There is plenty of garden space where convalescents can take air and exercise enjoyably.

Dr. Brock tells us that at the time of the unit's arrival (Sept. 5th, 1915) the villa was occupied as an Italian hospital and the first ambulance work consisted in transporting some 50 patients to the neighbouring Abbazia Hospital. Much had then to be done both in improving the very bad sanitary conditions and in adapting the villa to its purpose. This work, performed almost entirely by members of the unit, was speedily carried out. On Sept. 12th was received the first batch of 8 patients, and by the end of the month the number accommodated was 55. After dealing with defective sanitation the unit turned its attention to getting a satisfactory water-supply. Water from a deep well was found by Captain Franchini, of the VI. Army Corps, to be quite free from pathogenic organisms. A second source from an open stream, in spite of filtering, was impure, but no doubt often found its way into the unit's food and drink. Fortunately another source became available from the Acquedotto Poiano by the kind help of Colonel Moreno, of the "Genio" of the Army Corps, to which the unit is attached. This water is of excellent quality and practically unvarying quantity, is moderately soft, and under high pressure. The effect of this new water-supply on the health of the unit was immediate, there being no longer cases of diarrhoea. The absence of heating arrangements did not lead to serious inconvenience during the summer, but on the approach of cold weather something had to be done. The Genio provided stoves for all the wards and also for some of the rooms. By means of these and a number of petroleum stoves the villa has been fairly well heated. The villa is lighted by its own electric installation of gas-engine accumulators. The laundry arrangements were totally inadequate. Application was made to General Cavicchia, of the Direzione di Sanità of the 2nd Army, laying before him a scheme for the erection of a disinfecting-room, washhouse, ironing-room, and drying-room, which he very kindly had carried out by the Genio, and also provided a steam disinfecter and a complete set of apparatus, consisting of two large galvanised-iron boilers, a soaking tank, and a rinsing machine. Regarding the disposal of refuse, all combustible materials are burnt by two incinerators—one of brick built by the unit, the other of iron supplied by the Direzione di Sanità. Non-combustible materials are buried in a neighbouring field.

The original idea in the minds of the organisers of the ambulance unit, Dr. Brock tells us, was to provide as an adjunct to it a small evacuation hospital of 25 beds with 25 stretchers for cases requiring to remain in the hospital for a few hours only. The accommodation, however, has been gradually so greatly extended that 97 patients can now be provided with beds, and there is room in an emergency for more. The unit's funds do not at present allow of filling more than about 65 of these, and this may be considered for the moment the normal number. The ground floor of the villa was appropriated, as far as possible, for hospital purposes. The outbreak of Asiatic cholera made it necessary to prepare an isolation ward. A part of the granary was partitioned off into two rooms, one for suspected cases and the other for cases such as typhus or cholera. After the great battle in the first week of November, 1915, a great rush of wounded came from the Gorizia section. All the beds (54) in the villa were quickly filled and the remainder of the patients were put on mattresses or on straw in the granary in four long lines. As many as 150 patients were at one time in the hospital. The remaining part of the granary has since been partitioned off and divided into two, so as to form two large wards.

An out-patient department has also become a necessity. Many soldiers sent from the front into reserve are encamped in this neighbourhood, often unaccompanied by a medical officer. In case of illness they usually come for advice to this hospital. The number of these soon necessitated an out-patient department. A waiting-room and consulting-room have been partitioned off in the granary, and this work is undertaken by an Italian colleague, Lieutenant De Lisi, who has been attached to the unit from the first and has rendered invaluable assistance.

The pharmacy of the hospital is under the care of Lieutenant Balotta, another Italian officer detailed by the Direzione di Sanità to assist the unit. A certain amount of the drugs used has come from England, but the greater part of the pharmacy supplies is obtained from the "Magazzino Avanzato" of Udine. These are used not only for the hospital, but also for the out-patients. A certain equipment (hospital supplies other than drugs) was brought out from England and more followed later by sea. But a great many things had to be obtained locally, as, for instance, the furniture of the operating-room. Fortunately a large number of bales containing such stores, collected by the Ladies' Committee in England and Scotland, were sent with members of the unit coming out in time for the great rush of wounded. Since then the hospital has received many generous contributions of money and supplies from friends in Britain and from British residents in Italy. Large consignments have been received from various war hospital supply depots, including those of Kensington, Belgravia, Norwich, and Rome, and a very large one has now arrived from the Scottish Red Cross.

When the hospital was opened in September, 1915, the unit expected to act only as a clearing station. Later, according to instructions received from Colonel Moreno in regard to the stay of wounded in the hospital, the unit was to work only as a field hospital. It was soon realised, however, that when little fighting was in progress the work done might be that of a small base hospital, but when a rush of wounded is anticipated all the sick and wounded who can be safely transported are evacuated in order once more to take on the rôle of a field hospital.

The medical staff consists of the chief medical officer, who is also its "direttore," and two surgeons. The present chief medical officer has been with the unit since its work began. The two surgeons, Dr. W. E. Thompson, and Dr. W. A. Propert, joined later—in October, 1915—when Dr. W. R. Dakin and Professor Henry Tonks, F.R.C.S., the well-known artist, who had come out with the unit, were obliged to leave by other engagements. Mr. R. Creasy, of Windlesham, Surrey, took duty for a month at the beginning of 1916 in the absence of one of the surgeons. Dr. Propert rejoined some time ago. As to nursing, the unit at first went on as best it could with the help of men belonging to the unit and of some Italian soldier orderlies. Nineteen of the members, seven of them medical students, took duty as nurses and dressers. Eventually the authorities consented to female nurses being employed. The advent of female nurses made a vast difference for the better, many of them speaking Italian. Of our male nurses and dressers only five remain on the hospital side.

Up to the end of March, 1916, the numbers of patients treated were as follows :—

Consultations in out-patient department	...	1422
Total admitted to hospital up to March 31st	...	1022
" discharge "	...	967
In hospital on April 1st	...	55
Average number of days in hospital per patient	...	9·8
Total number of deaths	...	27
Deaths per cent. of patients admitted	...	2·6
" among sick only "	...	0·1
" wounded only "	...	4·5

The death-rate was thus very low considering the many severe cases. The only death among medical cases was in a case of double pneumonia. The 398 sick discharged were nearly all cured or convalescent. Among the few exceptions were eight cases of cholera removed to cholera hospitals on diagnosis, four terminating fatally. Cases of frozen feet with the skin apparently uninjured have been counted as medical, but those with the skin blistered or broken as surgical. The nature of the medical cases chiefly met with will be seen from the following table, relating to 450 sick admitted up to the end of March, 1916.

Disease.	Percentage to total sick.	Months of prevalence.
Frozen feet...	14·0	December, January, and February.
Gastro-enteritis (including gastritis and enteritis) ...	13·5	All months, but especially December and March.
Fever of influenzal type,	12·0	December and March.
" trench fever "	...	
Rheumatism, chronic and muscular...	9·0	All months.
Bronchitis ...	7·0	From November onwards.
Jaundice ...	6·0	January, February, and March.
Paratyphoid ...	3·8	From November onwards.
Pleurisy ...	2·9	From December onwards.
Otitis media ...	2·0	
Conjunctivitis ...	2·0	February and March.
Cholera ...	1·8	Nov. 9th to Dec. 7th.
Pneumonia ...	1·6	December, January, and February.

It is remarkable that no case of cholera occurred in members of the unit, many of whom were constantly coming in contact with cholera patients; this was no doubt the result of the precautions taken, including anti-cholera vaccinations of nearly all the members shortly after arrival with vaccine supplied by the Lister Institute of London. It is also striking to find true typhoid absent, as well as the comparatively large number (17) of paratyphoid cases. In the Italian Army antityphoid vaccination has been practised, but not anti-paratyphoid vaccination. A combined vaccine is, however, now being largely used containing 800 million typhoid and 500 million paratyphoid B bacilli per cubic centimetre, in three doses at intervals of a week, the last two doses of 1 c.c. being double the first. The paratyphoid was on the whole of a benign type and unaccompanied by grave complications. A great difference of opinion prevails as to the causation of " piedi congelati " (frozen feet). Dr. Brock is convinced that the puttee is the chief offender.

There have been a great many visitors, both Italian and English. The King of Italy has paid three visits, at the last one decorating the commandant, Mr. G. M. Trevelyan, with the silver medal for valour. Another royal visitor on three occasions was the Duchess of Aosta.

A report follows on the surgical cases in the hospital by Mr. W. E. Thompson, M.B., Ch.B. Edin. The numbers of surgical cases, he tells us, greatly varied. At the commencement wards had been prepared and an operating theatre reconstructed. Instruments in large variety, tables and cupboards of good sterilisable material were procured and a good supply of dressings was put ready to hand. It was soon found that more apparatus was needed, especially a bacteriological laboratory and an X ray installation. Both of these have since been sent, the microscope the gift of Miss Gray, of Rome. The other gift, the X ray installation, is largely owing to the generosity of Dr. Barbour, of Edinburgh, and Mr. Saunders, of Croydon. A great variety of surgical cases has been dealt with from cuts and bruises to severe head, chest, and abdominal injuries. Up to March 31st, 1916, there were 84 operations, 34 of these being major. Taking into account the severity of so many cases where the only object attainable was relief of suffering, the death-rate of operation cases was just over 10 per cent. and the total mortality of all surgical cases about 1·5 per cent. There were 21 amputations of the leg and arm—12 being of the leg. Four cases of traumatic empyema were operated

on, in one a piece of shrapnel being literally picked off the back of the heart. Practically every surgical case required drainage in some form, and some for a length of time. For gas gangrene nothing was found better than peroxide of hydrogen and eusol, followed by 5 per cent. saline. The best absorbent dressing for these cases was the sphagnum moss bags presented by Mr. O. W. Cathcart, of Edinburgh, and others. These were a great saving in dressings as well as an ideal dressing.

Two supplementary reports bring the figures up to the end of June and August respectively, and deal with the second year of work. During the three months April to June the total patients admitted increased from 1022 to 1492—792 sick, 700 wounded. Unfortunately on June 7th the unit lost Dr. Propert's services by his enforced return to England. For the month of August the admissions to hospital reached a high figure, especially in the early part during the great Italian offensive which resulted in the capture of Gorizia, when there was a daily average of 160 occupied beds. As may be easily imagined, the strain on organisation and personnel was very severe, since not only were the numbers sometimes double that for which the unit is normally equipped, but it had to play the rôle of a clearing hospital as well. Fortunately a great many wounds were light, many patients in a day or two being fit to return to their regiments. Great although the strain was, everything went on with wonderful smoothness and efficiency, calling forth praise both from the Italian military and sanitary authorities and from the Chief Commissioner of the British Red Cross for the Mediterranean, Sir Courtauld Thompson, who happened to be here during the most strenuous part of it.

#### THE PANEL COMMITTEE FOR THE COUNTY OF LONDON AND THE MOBILISATION OF THE MEDICAL PROFESSION.

The following resolutions were passed by the Panel Committee of the County of London at their meeting on Tuesday last, Jan. 9th :—

(a) That the Panel Committee are of opinion that, in respect to the proposal to mobilise the medical profession, it is essential, in order to secure the efficient working of any scheme adopted, that extended powers be conferred upon the Central Medical War Committee in connexion therewith, and that the personnel of the Committee be strengthened by the addition of at least six practitioners actively engaged in panel practice, one of whom should be a woman.

(b) That the Panel Committee are of opinion that, in so far as the recommendations of the Central Medical War Committee shall have reference to the services rendered by the medical profession to the civil population, if accepted, these should be carried into effect by a small executive committee appointed from the members of the Central Medical War Committee, with lay members appointed by the Director of National Service.

(c) That the Panel Committee are of opinion that the difficulties of these Committees in this connexion would be greatly lessened and a considerably increased number of medical men set free for active service abroad without serious interference with the medical needs of the civilian population if much greater use were in future made of the part-time services of civilian doctors for the treatment of sick and wounded soldiers whilst in hospitals and for other military duties in this country.

(d) That copies of the foregoing resolutions be forwarded to the Central Medical War Committee, the Director of National Service, and to the other Government Departments concerned.

We comment on these resolutions elsewhere.

**CONVALESCENT HOME IN CALCUTTA.**—An offer has been made and accepted from Calcutta to entertain 100 men and 10 or more officers invalided from Mesopotamia. Mr. Galstaun has given the use of his house in Circular-road, while Raja Kristo Das Law has lent No. 23 Theatre-road as a residential club for convalescent officers. The Calcutta nursing division of the St. John Ambulance Brigade are fitting out these two fine residences for the purposes they are to serve. The estimated cost of the furnishing and upkeep for five months has been put at 1½ lakhs of rupees, and this amount is likely to be forthcoming.

**METROPOLITAN ASYLUMS BOARD: THREATENED SHORTAGE OF AMBULANCES.**—The lack of motor and driver mechanics is reducing the ambulance service of the Asylums Board to a dangerous extent. The Ambulance Committee states that 37 per cent. of the ambulances are awaiting repair, and that probably within a few months the ambulance service will be unable to remove fever patients from their homes. The committee urges on the Board the necessity for the return of mechanics who have been taken for Army or munitions service.

## Obituary.

### THE SENATOR DE GIOVANNI.

OUR Rome correspondent writes:—After Grocco, Baccelli, and, after Baccelli, De Giovanni, the Tuscan, the Roman, and now the Venetian schools respectively have, in the year just closing, lost their most brilliant medical ornaments.

Born near Mantua on Sept. 27th, 1837, Achille De Giovanni began his medical studies in his native Lombardy, but, like so many of his compatriots, had to suspend them on the outbreak of the war against Austria. Serving under Garibaldi, whose commendation he earned in the fighting line, he re-entered the classes in 1860, the year of Lombardy's liberation, and threw himself into their work with an ardour which carried him with distinction through the curriculum till his graduation, with honours, in the final school. More than one University thereafter solicited and gained his services on its clinical staff, Pavia, Naples, and Padua especially, but in the last-named he found such acceptance that he never left it, and became from year to year the most popular and effective teacher on its medical professoriate. A consultant in much request throughout the kingdom, he was also a conspicuous figure at the medical congresses held annually in the leading cities, contributing to the transactions and debates papers on auscultation and percussion, on gout, on "dry arthritis," and on the pathology of the vena cava inferior, to enumerate some of his best known work. But in his later years State medicine became his absorbing interest, particularly in the field of tuberculosis, where he followed up a series of elaborate clinical investigations by others of a purely prophylactic tenor, till he was recognised as the inspiring spirit, and indeed as the initiator, of the "Lega Internazionale contro la Tubercolosi." His professional distinction and his public spirit won for him admission into the Senate of the kingdom, where he made his knowledge and his sagacity felt in many a debate on hygienic legislation. In private life he was austere even to stoicism, while essentially kind of heart and gracious in manner and address. His death, in its dramatic suddenness, was quite in keeping with the tenor of his life. He had opened the Medicus Annus of the Paduan school by a brilliant address on Monday, Dec. 4th, when, next day, he fell ill with cardiac symptoms supervening on the rheumatism to which he had long been a martyr, and in four days he succumbed. In both Houses of Parliament his death was put on record as a "national loss," while his Alma Mater, of which he had for four years been Rector Magnificus, suspended its functions, with the flag of Italy half-mast high.

## Medical News.

UNIVERSITY OF LONDON.—At the First Examination for Medical Degrees, held recently, the following candidates were successful:—

Frances Dacre Alexander and Eleanor Mary Ashmall, London (Royal Free Hospital) School of Medicine for Women; Frederick Bach, London Hospital; Ormonde Alan Baker, University College; Gladys Licha Buckley, Girton College; Dora Mahalah Cadman, London (Royal Free Hospital) School of Medicine for Women; Antoine Yves Cantin, London Hospital; Linda Catmull, Dorothy Spencer Chamberlain, Ivy Collier, and Annie Eveline Connan, London (Royal Free Hospital) School of Medicine for Women; Marguerite Ellaline Cooke, private study; Rustam Nusserwanji Cooper, University College; John Alexander Currie, Guy's Hospital (distinction in Physics); Percy Tyson Davidsen, Middlesex Hospital; Betty Dent, London (Royal Free Hospital) School of Medicine for Women; Conor John Donegan, St. Paul's School and St. Bartholomew's Hospital; Hilda Ray Dutton, University College, Exeter; Keridwen Valentine Edwards, University College, Cardiff; Lucy Margaret Esham, Victoria University of Manchester; Rueland Henry Evans, University College, Cardiff; Geoffrey Edward Woolcombe Felice, Guy's Hospital; Emmie Dorothy Fenwick, London (Royal Free Hospital) School of Medicine for Women; Olive Gwendolin Fisk, Girton College; William John Gale, B.Sc., Battersea Polytechnic S.W. Polytechnic, and private study; Mark Garden, London Hospital; Lena Bella Gayer and Geraldine Norah Geary, London (Royal Free Hospital) School of Medicine for Women; Brian Wilson Barnett Gordon, Epsom College and St. Mary's Hospital; Barnett Gould, S.A., London Hospital; Marjorie Pearl Christine Greene, Roedean School; Stanley Allwright Gunter, St. Bartholomew's Hospital; Frederick James Simkin Hall, University College, Reading; Gertrude Eleanor Harre, Girton College and London (Royal Free Hospital) School of Medicine for Women; Elizabeth Merriman

Heath, Marjorie Browning Hubert, and Irene Esther Kenworthy, London (Royal Free Hospital) School of Medicine for Women; Oscar Bevan Lean, Bootham School; Bessie Levin, University College; Denzil Haydn Lewis, St. Mary's Hospital; Ivor Lewis, University College, Cardiff; Muriel Jessie Lough, B.Sc., Birkbeck College; Mary Catherine Lynch, London (Royal Free Hospital) School of Medicine for Women; Ivan Bailey McCann, Guy's Hospital; Dorothy McNair, London (Royal Free Hospital) School of Medicine for Women; Edward Francis Malins, King Edward's High School, Birmingham; Harold Jordan Malkin, University College; Amin Mikhail, King's College; Emily Marjorie Milnes, London (Royal Free Hospital) School of Medicine for Women; Sybil Grace Moccatt, King's College and London Royal Free Hospital School of Medicine for Women (distinction in Inorganic Chemistry and in Physics); Leslie Stuart Morgan, St. Bartholomew's Hospital; Doris Maude Odium, B.A., London (Royal Free Hospital) School of Medicine for Women; Winifred Catherine Piggott, Bootham School, Bedford College, and London (Royal Free Hospital) School of Medicine for Women; Mary Winifred Pitt Lewis, Beatrice Myrtilla Powell, and Gwendolen Mary Pratt, London (Royal Free Hospital) School of Medicine for Women; Margaret Annette Quine, Victoria University of Manchester; John Grosscott Reed, Epsom College and St. Thomas's Hospital; James Stuart Ricketts, King's College; Edith Margaret Ross-Johnson, Newnham College; Effie Frederike Amelia Samter, Victoria University of Manchester; E. Virginia Saunders-Jacobs, B.Sc., Newnham College; Alfred Sonn, London Hospital; Christopher James Lewen Sharp, St. Paul's School; Thomas Archibald Shaw, Guy's Hospital and Mill Hill School; Abraham Isaac Silverman, Middlesex Hospital; Leonard Smalley, St. Thomas's Hospital; George Morris Stoker, Guy's Hospital; Edward Howard Strange, University College, Cardiff; William Hedley Summerskill, Guy's Hospital; Arthur Cleve Damian Telfer, St. Bartholomew's Hospital; Wenefride Thompson, London (Royal Free Hospital) School of Medicine for Women; Estlin Hugh Weatherall, St. Bartholomew's Hospital (distinction in Biology); Leslie Ralph Augustus Wells, Guy's Hospital; Enid Margaret Williams, Swansea Technical College and King's College; Trevor Morgan Raleigh Williams, Swansea Technical College and University College; Henry Norman Witham, St. Thomas's Hospital; and Jacob Elias Zeitlin, London Hospital.

EXAMINING BOARD IN ENGLAND BY THE ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—At examinations held recently the following candidates were successful:—

#### FIRST PROFESSIONAL EXAMINATION.

*Chemistry and Physic.*—Barbour Dous, King's College; John Caradoc Evans, London Hospital; Barnett Goldfoot, St. Bartholomew's Hospital; Frank Guiver, London Hospital; Frederick Richard Hall, St. Thomas's Hospital; Stratford Smith Hewitt, St. Mary's Hospital; Archibald Louis Percy Jeffery, Merchant Taylors' School; Evan Thomas Lloyd, Guy's Hospital; Elizabeth Kathleen Mackay and Norah Katharine Priestley, London School of Medicine for Women; Isaac Rosenberg, Guy's Hospital; Hans Rundstrom, King's College; James Mortimer Schofield, St. Mary's Hospital; Joseph Stanley Thomas, London Hospital; William John Vickers, Birmingham University; and May Grant Williams, London School of Medicine for Women.

*Physics.*—Jose Roberto Azurdia, Liverpool University; Montague Hirsch Burks, London Hospital; Henry Thomas Chiswell, Guy's Hospital; Octavio de Felix Pedrosa, London Hospital; John Hurley Piddock, Birmingham University; Tewfik Yusif Suliman, King's College; and Donald Radcliffe Thompson, London Hospital.

*Chemistry.*—William Laing Dunlop and Edward Richard Hughes, Liverpool University; Joseph Sonenberg-Bergson, King's College; and Daisy Coutts Wallace, Birkbeck College.

*Biology.*—Douglas Robert Ainsworth, Manchester University; Samuel Edward Amos, St. Thomas's Hospital; Jose Roberto Azurdia and William Ryding Bennette, Liverpool University; Ernest Gower Bryant, Manchester University; Samuel Bacon Chambers, University College, Southampton; Leslie Charles Frederick Chevens, St. Thomas's Hospital; Abdallah Yakub Dowek, Manchester University; William Laing Dunlop, Liverpool University; John Caradoc Evans, London Hospital; Rihd Akhnoor Fanous, Manchester University; Leslie Joseph Gabe, Middlesex Hospital; John Burnall Gann, London Hospital; Stratford Smith Hewitt, St. Mary's Hospital; Janet Hughes, South Western Polytechnic; Gerald Israelsam, London Hospital; Frederick James, Charing Cross Hospital; Archibald Louis Percy Jeffery, Merchant Taylors' School; Eric John Llewellyn Jones-Evans, St. Thomas's Hospital; Harold James Lyon, Guy's Hospital; Elizabeth Kathleen Mackay, London School of Medicine for Women; Horace Abe Nathan, South Western Polytechnic; Hilda Margaret Neal, Royal Free Hospital; John Hurley Piddock, Birmingham University; Francis Louis Rayner and Isaac Rosenberg, Guy's Hospital; Hans Rundstrom, King's College; James Mortimer Schofield, St. Mary's Hospital; Edgar James Targett, Birmingham University; Joseph Stanley Thomas, London Hospital; William Henry Turner, Guy's Hospital; and Charles Henry White, Birmingham University.

#### SECOND PROFESSIONAL EXAMINATION.

*Anatomy and Physiology.*—John Harrison Allan, Liverpool University; George Wilfred Almeida, London Hospital; Douglas Albert Raoul Aufranc, Middlesex Hospital; John Binford Barnett, Birmingham University; Richard Alec Dudley Jefferson-Bernhardt, Middlesex Hospital; Sarah Aileen Florence Boyd-Mackay, London School of Medicine for Women; William Mark Brown, Guy's Hospital; Harris Cohen, University College, Cardiff; Hyman Solomon Cohen, London Hospital; Morris Cohen, Guy's Hospital; Cecil Gerald Segeley Corner, Madras Medical College; John Paul de Silva, London Hospital; Theodore Henry Dobrashian, University College; Keith Mitchell Keitley Duff, Guy's Hospital; Cecil Weldon Empey, London Hospital; Gwilym Pennant Evans, St. Mary's Hospital; James Fanring, London Hospital; Lucie Gaillard, Madras Medical College and King's College; William Bertram Hargreaves, Aberdeen and Manchester Universities; William George Hay, South African College and Guy's Hospital; Arthur

Robert Hill, Middlesex Hospital; Reginald Walter Patrick Hosford, St. Bartholomew's Hospital; Graydon Hume and Mahmoud Fahmy Ismail, Guy's Hospital; George Valentine Chapman Last, Liverpool University; Hyman Jacob Levy, University College, Cardiff, and St. Bartholomew's Hospital; Elisabeth Esther McColloch, Liverpool University; Ambali Krishna Menon, Madras Medical College, and London Hospital; Amin Mohamed Mishad, King's College; Eva Morton, London School of Medicine for Women; James Lucius Cumillo O'Flynn, University College, Cardiff, and St. Bartholomew's Hospital; Evan Albert Iris Phillips, University College; Leslie Penhall Phillips, Henry Chris'offers Powell, and Charles Nathaniel Reid, King's College; John Charles Ryder Richardson, London Hospital; Albert Ernest Sawday and Harry Norman Schapiro, Guy's Hospital; Campbell Shaw, St. Bartholomew's Hospital; Latif Abtalib Simtka, Cairo and St. Bartholomew's Hospital; Younis Ahmed Sunbul, St. Mary's Hospital; Beriah Melbourne Gwynne Thomas, University College, Cardiff; George Marston Trist, King's College; Alfred Douglas Weston, Middlesex Hospital; Gladys Mary Thurlow Williams, Cardiff, and Birmingham University; John Edward Wright, Guy's Hospital; Owen Waller James Wynne, Dublin, and King's College; and Alfred Ernest Young, Bristol University.

**ROYAL COLLEGE OF SURGEONS OF ENGLAND.**—The second series of lectures on the Anatomy of the Human Body will be delivered by Professor Arthur Keith, Conservator of the Museum, for first-aid and ambulance students, at 5 P.M., in the theatre of the College in Lincoln's Inn Fields, on Mondays, Wednesdays, and Fridays, commencing on Monday next, Jan. 15th. Anatomical preparations and specimens, used for purposes of illustration, will be placed on exhibition in the theatre from 3 to 5 P.M. on each lecture day. On the following day the same preparations will be placed in the hall of the Museum, where they may be studied between the hours of 10 A.M. and 5 P.M.

At the Preliminary Science Examination for the Licence in Dental Surgery the following candidates were approved in the undermentioned subjects:—

*Chemistry and Physics.*—Reginald James Hooker, Municipal Technical College, Brighton; Elisha Clemens Kent, South African College; Philip Heygate Knowles, Rearing School; George Levy, Guy's Hospital; Peter John Morrison, South African College and Guy's Hospital; and George Edward Smith, Liverpool University. *Chemistry.*—Levi Austin Brown, University of North Wales, Bangor; and Gilbert James Burberry Rowe, Municipal College, Bournemouth. *Physics.*—Gerald Fraser Smith, Middlesex Hospital.

**ROYAL MEDICAL BENEVOLENT FUND.**—At a meeting of the committee held on Dec. 12th, 1916, 30 cases were considered, and £317 15s. granted to 28 of the applicants. The following is a summary of the cases relieved:—

**Widow, aged 44,** of M.B. Lond. who practised in London and died in August, 1916. Owing to the war it was impossible to sell the practice. Applicant lives in own house, which is to be sold, and when he affairs are settled her income will only be about £120 a year. Has two children, aged 8 and 9. Wants help towards the education of her son who is a candidate for Epsom, but not likely to be elected for over a year. Voted £5.—L.R.C.P. Eltin., married, who practised at Berwick. N.B. Owing to ill health his earnings have only been about £70 per annum for some time, and his wife, aged 70, is now blind, and a daughter who was a housekeeper has had to give up her post so as to be able to nurse her father and mother. Voted £21 in two instalments.—Daughter, aged 69, of M.R.C.S. Eng. who practised at Cambridge and died in 1897. Applicant was able to earn a living by taking in paying guests on the south-east coast until the war commenced, but since has not been successful, and has had to give up her house. Only income £35 per annum. Relieved once, £12. Voted £12 in 12 instalments.—Daughter, aged 70, of M.R.C.S. Eng. who practised in London and died in 1873. Applicant was a governess in Russia when the war commenced, and all her savings were in a Berlin bank. For the last two years has earned a living by clerical work, but her eyesight has now failed, and has had to give it up. Only income a pension of £30 from another charity. Relieved twice, £24. Voted £12 in 12 instalments.—Daughter, aged 59, of M.R.C.S. Eng. who practised in India and London and died in 1873. Applicant left unprovided for, and owing to ill-health unable to earn a living. Only income £2 per annum. Relieved three times, £22. Voted £10 in two instalments.—Daughter, aged 58, of M.R.C.S. Eng. who practised at Hammersmith and died in 1908. Owing to ill-health unable to work, and only income occasional help from friends and from the Guild. Relieved nine times, £122. Voted £18 in 12 instalments.—Widow, aged 59, of L.S.A. Lond. who practised at Bournemouth and died in 1913. Has endeavoured to earn a living by taking in lodgers, but since the war has been unsuccessful, and has only received £3 this year. Has received a gift of £26 from another society. Relieved twice, £24. Voted £12 in 12 instalments.—Daughter, aged 51, of M.R.C.S. Eng. who practised in London and died in 1891. Left without means and very delicate, and her small income has had to be expended on medical attention. Income £25 from another society. Relieved seven times, £74. Voted £10 in two instalments.—Daughter, aged 51, of M.R.C.S. Eng. who practised at Gillingham and died in 1914. Applicant left without means, her father having been an annuitant of the Fund for some years. Never trained to work and can only earn a few shillings a week in a domestic capacity. Relieved three times, £29. Voted £12 in 12 instalments.—Widow, aged 74, of M.R.C.S. Eng. who practised at Rye and died in 1891. Applicant's income is not more than £50 per annum, and she has cataract in both eyes. Her two daughters are married and unable to help her. Relieved once, £12. Voted £12 in 12 instalments.—Widow, aged 55, of M.R.C.S. Eng. who practised at Yelverton and died in 1908. Left without means and endeavours to make a living by taking in boarders, but is not successful. Her eyesight is bad. Relieved ten times, £119. Voted £12 in 12 instalments.—Daughters, aged 44, 51, and 55, of M.R.C.S. Eng. who practised at Bodmin and died in 1912. On the death of the father the life interest in an estate ceased, and the only certain income of the applicants is £5 each. Two suffer from bad sight and the other quite unable to work. Relieved once, £18. Voted £18 in 12 instalments jointly.—Daughter, aged 70, of M.D. Lond. who practised at Cheltenham and died in 1879.

Applicant was left without means and has always had fair health, and is now suffering from acute rheumatism. Only income £39 per year from another charity and a small annuity. Relieved three times, £36. Voted £12 in 12 instalments.—Widow, aged 43, of M.R.C.S. Eng. who practised in North Wales and died in 1910. Applicant was left without means and had two young children, now aged 10 and 7 years. Lives with her aged parents who are not well off, and can only provide a home. Relieved five times, £50. Voted £10 in two instalments.—Widow, aged 73, of L.S.A. Lond. who practised in Bermondsey and died in 1887. Applicant managed up to the commencement of the war by keeping a boarding house on the south-east coast, but has had to close it down, and is still responsible for various charges against the house. Two children who help as they can. Relieved once, £15. Voted £2 and referred to the Guild.—Widow, aged 52, of M.D. Dub. who practised at Widnes and died in 1915. Left totally unprovided for with three children, only one of whom is working. Applicant's health is very indifferent. Allowed to live rent free in a friend's house. Relieved once, £10. Voted £12 in 12 instalments.—Daughter, aged 55, of L.R.C.S. Glasg. who practised at Glasgow and died in 1883. Endeavours to earn a living by teaching music, but cannot obtain sufficient pupils. Only permanent income £25. Recommended by the Glasgow branch of the Guild. Relieved once, £12. Voted £12 in 12 instalments.—Widow, aged 58, of L.S.A. Lond. who practised at Limehouse and died in 1891. Applicant was left unprovided for with two young daughters, both of whom are now working, but only able to earn a little. Burns a little by needlework, but finds it difficult to meet expenses. Relieved nine times, £33. Voted £12 in 12 instalments.—Widow, aged 71, of M.D. Eltin. who practised at Cambridge and died in 1908. Applicant endeavours to make a living by taking in boarders, but is not successful. Friends provide £18 per annum. Relieved six times, £48. Voted £12 in 12 instalments.—Wife, aged 36, of M.B. Dub. who practised in various places in England and Ireland. Applicant had to leave him 18 months ago on account of his habits and cruelty. One child 12 years old. Applicant is a trained nurse, but unable to take permanent work on account of the child. Relieved once, £9. Voted £5 in two instalments.—Widow, aged 57, of L.S.A. Lond. who practised at Islington and died in 1905. Applicant left unprovided for with two sons, both of whom joined the Army; one was killed and the other is missing. Applicant is nearly blind, and health is very precarious. Relieved 12 times, £145. Voted £18 in 12 instalments.—Daughter, aged 64, of M.D. Eltin. who practised in London and died in 1873. Applicant has two sisters, and they endeavour to make a living by keeping a boarding house. The recent death of the mother has depleted the family income, as she has a pension which died with her, and the high cost of living makes it difficult to get on. Relieved once, £10. Voted £10.—Daughter, aged 60, of M.R.C.S. Eng. who practised at Yoxford and died in 1893. Has always had bad health, and two relatives who used to help her have died. Only income a pension of £29 from another society. Relieved eight times, £30. Voted £12 in 12 instalments.—Daughter, aged 59, of L.R.C.P. Lond. who practised at Brierley Hill and died in 1872. Has never been able to work through ill-health and has recently fractured her ankle. Only income a pension from another society of £25. Relieved nine times, £65. Voted £12 in 12 instalments.—Daughter, aged 43, of M.B. Eltin. who practised at Southampton and died in 1836. Applicant is a trained midwife, but owing to suffering from Bright's disease and heart trouble is unable to work. Only income 10s. 6d. per week allowed by friends. Relieved three times, £24. Voted £12 in 12 instalments.—Widow, aged 62, of L.R.C.P. Irel. who practised at Liverpool and died in 1885. Applicant earns a living by nursing, but owing to indifferent health and bad cough unable to obtain permanent work, and only earned £22 during the year. Relieved four times, £22. Voted £12 in 12 instalments.

The committee also granted special war-time Christmas gifts of £1 each to 150 annuitants and 120 grantees. Subscriptions may be sent to Dr. Samuel West, hon. treasurer, at 11, Chandos-street, Cavendish-square, London, W.

**THE KING HAS SANCTIONED THE FOLLOWING PROMOTIONS IN THE ORDER OF THE HOSPITAL OF ST. JOHN OF JERUSALEM IN ENGLAND:**—Colonel Sir John Rose Bradford, K.C.M.G., C.B., F.R.S., A.M.S.; Colonel Alfred Percy Blenkinsop, C.B., A.M.S.; Colonel Sinclair Westcott, C.B., C.M.G., A.M.S., and Surgeon-General John Chislet Culling, A.M.S., to be Knights of Grace; and Lieutenant-Colonel William Richard Blackwell, R.A.M.C., and Fleet-Surgeon Robert William Glennan Stewart, R.N., to be Esquires.

**ROYAL SOCIETY OF ARTS (JOHN-STREET, ADELPHI).**—Amongst the lectures announced for the coming session are the following:—W. A. M. Goode, honorary secretary of the National Committee, on "Relief Work in Belgium" (Jan. 24th); Dr. R. Fortescue Fox on "The Future of British Spas" (Feb. 7th); Lawrence Chubb, secretary of the Commons Preservation Society, on "High-ways and Footpaths." The time in each case is 4.30 P.M. Admission is by ticket.

**ROYAL SANITARY INSTITUTE.**—A discussion will take place on Wednesday, Jan. 31st, at 4.30 P.M., at 90, Buckingham Palace-road, on the physical welfare of children after infancy from the national, social, and public health standpoints. The debate will be opened by Dr. W. Leslie Mackenzie, medical member, Local Government Board for Scotland. The chair will be taken by Sir George Newman, chief medical officer, Board of Education.

**THE LATE SIR F. W. BORDEN.**—Frederick William Borden, who died last week in his seventieth year, came of medical parentage and was a medical graduate of Harvard, and entered the Canadian Army Medical Service as assistant surgeon to the 63rd Militia Regiment (King's County) in 1869. He rose to the rank of surgeon lieutenant-colonel and honorary colonel, and was made an honorary surgeon-general of the Imperial Army in 1911. He sat for 33 years in the Canadian Parliament.

## Appointments.

*Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

CORDINGLEY. GRACE, L.S.A., has been appointed Pathologist to the Venereal Diseases Department, Royal Free Hospital.  
DINNICK, O. T., M.R.C.S., L.R.C.P. Lond., Senior Assistant to the Venereal Diseases Department, Royal Free Hospital.  
GREEN, EDITH M. N., M.B., B.S. Lond., Senior Assistant to the Venereal Diseases Department, Royal Free Hospital.  
TOCKER, J., M.B., C.M., Medical Officer for the Morthooe District by the Barnstaple (Devon) Board of Guardians.

## Vacancies.

*For further information regarding each vacancy reference should be made to the advertisement (see Index). When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.*

BATH, EASTERN DISPENSARY.—Resident Medical Officer. Salary £140 per annum, with furnished rooms, &c.  
BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.—Resident Medical Officer and House Surgeon for six months. Salaries £200 and £150 per annum respectively, with board, &c.  
BOLTON INFIRMARY AND DISPENSARY.—Female Second House Surgeon. Also Female Third House Surgeon. Salaries £200 and £180 per annum, respectively, with board, &c.  
BRIDGWATER HOSPITAL.—House Surgeon. Salary £120 per annum, with board, &c.  
BRISTOL GENERAL HOSPITAL.—House Surgeon for six months. Salary at rate of £175 per annum, with board, &c.  
CARDIFF, KING EDWARD VII'S HOSPITAL.—House Surgeon for six months.  
CHESTERFIELD AND NORTH DERBYSHIRE HOSPITAL.—Second House Surgeon. Salary £150 per annum, with board, &c.  
DORSET COUNTY COUNCIL.—Temporary Clinical Tuberculosis Officer. Salary £350 per annum.  
GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon. Salary £200 per annum, with board, &c.  
HARROGATE, FURNESS AUXILIARY HOSPITAL.—Resident Medical Officer. Salary £55 per month, with board, &c.  
HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.—House Surgeons, Assistant Casualty Medical Officer, and House Physician, unmarried. Salary at rate of £80 per annum each, with board, &c.  
HUDDERSFIELD COUNTY BOROUGH EDUCATION AUTHORITY.—Assistant School Medical Officer. Salary £350 per annum.

LEAMINGTON SPA, WARNEFORD GENERAL HOSPITAL.—Junior Resident Medical Officer. Salary £150 per annum, with board, &c.  
LEYTON URBAN DISTRICT COUNCIL EDUCATION COMMITTEE.—Temporary Assistant School Medical Officer and Temporary Assistant Medical Officer of Health. Salary at rate of £350 per annum.  
LIVERPOOL, BROWNLOW HILL INSTITUTION.—Resident Assistant Medical Officer. Salary at rate of £300 per annum, with rations, &c.  
MANCHESTER COUNTY ASYLUM, Prestwich.—Locum Tenens. Salary £7 7s. per week, with board, &c.  
MANCHESTER, HULME DISPENSARY, Dale-street, Stretford-road.—House Surgeon. Salary £250 per annum, with apartments, &c.  
NEWCASTLE-UPON-TYNE, ROYAL VICTORIA INFIRMARY.—Female Assistant in Venereal Diseases Department.  
NEW HOSPITAL FOR WOMEN, Buxton-road.—Female Senior Clinical Assistant in Out-patient and Ophthalmic Departments.  
NORTHAMPTON GENERAL HOSPITAL.—House Surgeon. Salary £150 per annum, with board, &c.

NOTTINGHAM AND MIDLAND EYE INFIRMARY.—Female House Surgeon.  
PADDINGTON GREEN CHILDREN'S HOSPITAL, London, W.—Clinical Assistant in Out-patients' Department, Monday and Thursday mornings.

PLAISTOW HOSPITAL FOR INFECTIOUS DISEASES, London, E.—Temporary Resident Medical Officer. Salary at rate of £250 per annum, and all found.

PORTSMOUTH BOROUGH MENTAL HOSPITAL.—Locum Tenens Assistant Medical Officer. Salary 7 guineas per week, with board, &c.

QUEEN MARY'S HOSPITAL FOR THE EAST-END, Stratford.—House Surgeon.

ROCHESTER, ST. BARTHOLOMEW'S HOSPITAL.—Clinical Assistant. Salary at rate of £110 per annum, with board, &c.

ROXBURGH DISTRICT ASYLUM, Melrose.—Medical Superintendent. Salary £500 per annum, with residence, &c.

ROYAL COLLEGE OF SURGEONS.—Election to the Court of Examiners.

ROYAL NATIONAL ORTHOPAEDIC HOSPITAL, 234, Great Portland-street, W.—Resident Surgical Officer.

ST. MARYLEBONE GENERAL DISPENSARY.—Resident Medical Officer. Salary £150 per annum, with furnished apartments, &c.

SHEFFIELD ROYAL HOSPITAL.—Assistant House Surgeon, unmarried. Salary £120 per annum, with board, &c.

SOUTH LONDON HOSPITAL FOR WOMEN, 103, South Side, Clapham Common, S.W.—Female House Physician for six months. Salary at rate of £100 per annum, with board, &c.

SURREY EDUCATION COMMITTEE.—Temporary School Dentist. Salary £300 per annum.

VENTNOR, ISLE OF WIGHT, ROYAL NATIONAL HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST ON THE SEPARATE PRINCIPLE.—Assistant Resident Medical Officer.

VICTORIA HOSPITAL FOR CHILDREN, Tite-street, Chelsea, S.W.—House Surgeon for six months. Salary at rate of £200 per annum, with board, &c.

WEST-END HOSPITAL FOR NERVOUS DISEASES, 73, Welbeck-street, W.—House Physician. Salary £250 per annum, with board, &c.

WORCESTER, CITY OF.—Female Temporary Assistant Medical Officer. Salary £250 per annum.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Paignton, Devon; Foyers, Inverness-shire; Wartle, Aberdeenshire; and Frodsham, Cheshire.

## Births, Marriages, and Deaths.

### BIRTHS.

BARROW.—On Jan. 4th, at Bishopston, Lockgilphhead, Argyllshire, the wife of Surgeon Murray Barrow, R.N., of a son.

DENHAM.—On Jan. 3rd, the wife of Captain Charles Holmes Denham, R.A.M.C., at Ladbrooke-terrace, of a son.

EWART.—On Jan. 2nd, at North-street, Chichester, the wife of Dr. David Ewart, of a son.

LAWRIE.—On Jan. 6th, at Ryde House, Woking, the wife of John Lawrie, M.B., C.M., of a son.

SUTTON.—On Jan. 4th, at a nursing home, Southsea, the wife of Captain H. A. Sutton, M.C., R.A.M.C.—a daughter.

### MARRIAGES.

CAMPION—SHELLEY.—On Dec. 30th, 1916, at St. Mark's Church, Alexandria, Captain Rowland Burnell Maule Campion, R.A.M.C., to Kathleen Sybil, daughter of Edgar Shelley, of London and Melbourne.

OKELL—ROBERTS.—On Jan. 2nd, at Holy Trinity Church, Stratford-on-Avon, Captain Charles Cyril Okell, M.C., R.A.M.C., to Dorothy Gladys, youngest daughter of the late W. Owen Roberts, Pulrose House, Isle of Man.

RADLEY—CLAYTON-SMITH.—On Nov. 30th, 1916, at St. Thomas's Cathedral, Bombay, Captain S. B. Radley, R.R.C.S., R.A.M.C., to Gladys, daughter of W. E. Clayton-Smith, of Pontefract.

SHERRIS—JONES.—On Dec. 30th, 1916, at St. George's, Tufnell Park, N., Captain Cyril Sherris, R.A.M.C., to Dorothy, youngest daughter of the late Charles G. Jones, formerly of Exeter-road, Bromdesbury.

### DEATHS.

BAZALGETTE.—On Jan. 7th, at Brent Knoll, Somerset, after a short illness, Sidney Bazalgette, M.R.C.S., L.R.C.P. Lond.

JOHNSTON.—On Jan. 4th, at 31, Waveley-street, Nottingham, James Hunter Johnston, M.B., M.S. Edin., aged 51.

MORRIS.—On Jan. 6th, at Parkside, Feltham, Middlesex, Colin Dwight Morris, M.R.C.S., L.R.C.P., aged 58.

TOWNSEND.—On Jan. 2nd, at Clontymon, Cork, Sir Edmund Townsend, K.C.B., C.M.G., Surgeon-General (retired), aged 71.

N.B.—A fee of 6s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

## BOOKS, ETC., RECEIVED.

ARNOLD, EDWARD, London. Medical Diseases of the War. By Arthur F. Hurst, M.A., M.D. Oxon., F.R.C.P., Temporary Major, R.A.M.C. 6s. net.

BAILLIÈRE, J. B., ET FILS, Paris. Les Appareils Plâtrés. Par le Dr. Calvé, Chef du Service Central de Physiothérapie de la Région du Nord, Chirurgien-Assistant de l'Hôpital Maritime de Bercy-sur-Mer; et Dr. Galland, Interné des Hôpitaux de Paris. 1 Vol. in-18 de 88 pages. 2 fr. 60.

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LORD BALTIMORE PRESS, Baltimore. Proceedings of the American Medico-Psychological Association at Old Point Comfort, Va., May, 1915.

MACMILLAN AND CO., London. A Text-book of Organic Chemistry for Students of Medicine and Biology. By H. V. McCollum, Ph.D. 10s. net.

ROCKEFELLER INSTITUTE, New York. Studies from the Rockefeller Institute for Medical Research Reprints. Vol. XXIV.

UNIONE TIPOGRAFICO-EDITRICE TORINESE, Torino, Milano, Napoli, Palermo, Roma. Trattato dei Neoplasmi Maligni, preceduto da uno studio sulle Infezioni Chirurgiche in Generale. Dr. D. B. Roncalli. Vol. Secondo. Lire 34.

UNIVERSITY OF CHICAGO PRESS. (London Agents: CAMBRIDGE UNIVERSITY PRESS.) The Control of Hunger in Health and Disease. By Anton Julius Carlson, Professor of Physiology in the University of Chicago. 9s. net.

WILTY, JOHN, AND SONS, New York. CHAPMAN AND HALL, LTD. Manual of Psychiatry. By J. Rogues de Fursac, M.D., and A. J. Rosanoff, M.D. Fourth edition, revised and enlarged. 10s. 6d. net.

## Notes, Short Comments, and Answers to Correspondents.

### HEALTH OF CEYLON.

A REPORT prepared by Mr. E. Sueter, Assistant Colonial Secretary, on the affairs of Ceylon for the year 1915, states that the estimated population of the island (exclusive of the military and shipping) is about 4,424,300, an increase of nearly 107,600 on that of the previous year, due to an excess of about 51,100 births over deaths and 56,000 arrivals over departures of Indian coolies. There are 113 males to every 100 females in the population of Ceylon. The birth-rate for the year was 37·0 per 1000 and the death-rate 25·0 per 1000, this latter being the lowest on record since 1898, when improved registration began, with the exception of the rate in 1904, when it was only 0·1 less. 171 infants under one year died to every 1000 born, against an average of 195. This rate is the lowest recorded during the preceding decennium. The proportion of deaths in the general community from certain principal causes to a million of the estimated population was as follows: Infantile convulsions, 2596; diarrhoea, 2465; bronchitis and pneumonia, 1146; putridis and other forms of tuberculosis, 952; dysentery, 774; ankylostomiasis, 468; malaria and malarial cachexia, 390; premature birth and congenital defects, 307; cancer, 92; enteric fever, 88; and small-pox, 35. Plague, which broke out in 1914 for the first time in the history of Ceylon, is still continuing, though the victims claimed in the year under review are very much less, as will be seen by the following record: Total cases in 1914, 413; ditto in 1915, 139; total deaths in 1914, 381; ditto in 1915, 128. On the other hand, and contrary to expectations, there was no diminution in the virulence of the disease, the total case mortality being 92 per cent., as in the previous year. 108 deaths per million were due to accidental drowning, 80 to falls from trees, and 53 to snake-bite; 342 deaths were attributed to homicide, against an average of 181. This corresponded to a rate of 77 per million—the highest ever recorded in Ceylon—and was due to the riots in June. The number of executions, too, rose to 76 from an average of 29, owing to the same cause.

There are 78 Government hospitals (in addition to the lunatic and leper asylums) equipped with modern hospital furniture and surgical appliances. The owners of estates have also provided 54 estate hospitals and 353 dispensaries. Four new hospitals are under construction. A general rebuilding scheme is in contemplation for the improvement of the Medical College. The full course of training for medical students is five years; a diploma in medicine, surgery, and midwifery (which can be registered in the United Kingdom) is granted to successful medical students. In Colombo there are a bacteriological institute, an ophthalmic hospital, a lying-in home, a hospital for women and children, and one for infectious diseases; there is also an establishment for the manufacture of calf lymph. The leper asylum, situated six miles from Colombo, contained 402 patients at the end of the year; the total treated during 1915 numbered 509. A smaller establishment for lepers exists at Kalmunai and has accommodation for 30, and it is now proposed to establish a leper colony at Mantivu in the Eastern Province.

The highest annual rainfall registered was at Garney Estate, Ratnapura, which had a total of 266·8 inches, and the lowest was at Mantota in Mannar, which had a total of 25·85. The annual rainfall at Colombo (Cinnamon Gardens) was 96·81 inches. The station showing the highest mean shade temperature for the year was Trincomalee with 84·4° F. and the lowest Nuwara Eliya with 60·7°. The figures for Colombo and Kandy were 81·0° and 77·1° respectively.

### STEAM-DISINFECTING APPARATUS.

We have received from the Grampian Engineering Company, Limited, of Stirling, N.B., and 43, Aldwych, London, W.C., an interesting brochure on "Modern Steam Disinfection," in which are described the "Velox" high-pressure steam and combined current-steam and vacuum-formalin disinfectors. The merits of these methods of physical disinfection are closely discussed and full illustrations of the various types of apparatus are given. Practical experiments are quoted demonstrating the sterilising efficiency of the machines.

T. B.—The statement was a definite and precise one and made as long ago as August 1st, 1916. In reply to a question by Mr. J. Anderson in the House of Commons, Mr. Forster stated as follows: "Instructions have been

issued to recruiting medical boards to ask each man definitely whether (a) he has been under treatment in a sanatorium; (b) his name has been notified to the sanitary authorities as suffering from consumption? No man whose answer to either of these questions in the affirmative will be taken into the Army, but it will obviously be necessary to verify his statements." Mr. Forster went on to add that the Local Government Board had arranged for local tuberculosis officers to supply particulars of all men of military age on the tuberculosis registers, and that these particulars would be supplied to the recruiting authorities with instructions that such men were not to be accepted for service. In cases of doubt the advice of tuberculosis officers was to be asked for.

N. K. M.—A special course on the diagnosis and treatment of venereal diseases is being held for London panel practitioners at the Rochester Row Military Hospital, S.W., and this is open to all medical men. Application should be made to Lieutenant-Colonel L. W. Harrison, R.A.M.C., at the hospital. Lectures have been announced at the London and Guy's Hospitals, and will doubtless be arranged at other metropolitan and provincial hospitals. Details will be given in our column devoted to control of venereal diseases. "A System of Syphilis" edited by D'Arcy Power and Murphy (Oxford Medical Publications, second edition, 1914. Five volumes. £2 2s.) is the most complete work in English on the subject. "A Manual of Venereal Diseases" (same publisher, second edition; 1913; 10s. 6d. net) is a practical volume. The Report of the Royal Commission on Venereal Diseases is a mine of information on the whole subject.

**ERRATUM.**—In the *Annus Medicus* in THE LANCET of Dec. 30th, 1916 (p. 1116), under the heading of "Army Medical Service," we referred to the duplication of the office of Director-General, and included the following phrase: "While Sir Alfred Keogh, who had been Director-General up to 1910, and who was in 1915 acting as Chief Commissioner for the British Red Cross Society in France and Belgium, became Director-General of the Army Medical Service at home." The year should have been stated as 1914 and not 1915.

COMMUNICATIONS not noticed in our present issue will receive attention in our next.

## Medical Diary for the ensuing Week.

### SOCIETIES.

#### ROYAL SOCIETY OF MEDICINE, 1, WIMPOLE-STREET, W.

##### MEETINGS OF SECTIONS.

Tuesday, Jan. 16th.

##### GENERAL MEETING OF FELLOWS: at 5 P.M.

Ballot for Election to the Fellowship.

Wednesday, Jan. 17th.

##### HISTORY OF MEDICINE (Hon. Secretaries—J. D. Rolleston, Charles Singer): at 5 P.M.

Exhibition of Books, Portraits, &c. (at 4.30 P.M.).

Paper:

Mr. R. R. Steele: A Medieval Panacea.

Thursday, Jan. 18th.

##### DERMATOLOGY (Hon. Secretaries—J. H. R. McDonagh, Henry MacCormac): at 5 P.M.

Cases (at 4.30 P.M.).

Friday, Jan. 19th.

##### ELECTRO-THERAPEUTICS (Hon. Secretaries—H. P. Cumberbatch, Robert Knox): at 8.30 P.M.

A CLINICAL EVENING will be held in the Electrical Department of St. Bartholomew's Hospital.

##### LONDON DERMATOLOGICAL SOCIETY, St. John's Hospital, 49, LEICESTER-SQUARE, W.C.

TUESDAY.—4.30 P.M., Clinical Cases will be shown by Capt. W. Griffith, R.A.M.C., Dr. J. L. Bunch, Dr. W. K. Sibley, Dr. C. Kempster, and Dr. M. Dockrell. Paper:—Dr. O. Kempster: The Action of X Rays upon Diseases of Bacterial Origin.

### LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

#### POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardo: Operations. Dr. Simson: Diseases of Women.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

**FRIDAY.**—10 A.M., Dr. Simon: Gynaecological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

**SATURDAY.**—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

**NORTH-EAST LONDON POST-GRADUATE COLLEGE,** Prince of Wales's General Hospital, Tottenham, N.

**MONDAY.**—Clinics:—10.30 A.M., Surgical Out-patients (Mr. H. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. E. Whipham): Gynaecological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

**TUESDAY.**—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting).

**WEDNESDAY.**—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M., Eye Operations (Mr. R. P. Brooks).

**THURSDAY.**—2.30 P.M., Gynaecological Operations (Dr. A. E. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

**FRIDAY.**—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. E. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

**THE THROAT HOSPITAL,** Golden-square, W.

**MONDAY.**—5.15 P.M., Special Demonstration of Selected Cases.

**TUESDAY.**—5.15 P.M., Clinical Lecture.

**ST JOHN'S HOSPITAL FOR DISEASES OF THE SKIN,** 49, Leicester-square, W.C.

**THURSDAY.**—6 P.M., Chesterfield Lecture:—Dr. M. Dockrell: Tuberculosis of the Skin and Lupus Erythematosus.

**ROYAL INSTITUTE OF PUBLIC HEALTH,** Lecture Hall of the Institute, 37, Russell-square, W.C.

Course of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—

**WEDNESDAY.**—4 P.M., Lecture I.:—Miss J. Lane-Claypon, M.D.: Principles of Organisation and Administration in Child Welfare Work. Lieut.-Gen. Sir Robert Baden-Powell, K.C.V.O., and Mr. F. J. Willis, C.B., have promised to take part in the discussion.

**ROYAL INSTITUTION OF GREAT BRITAIN,** Albemarle-street, Piccadilly, W.

**TUESDAY.**—3 P.M., Prof. C. S. Sherrington: The Old Brain and the New Brain, and their Meaning. (Lecture I.)

### M E T E O R O L O G I C A L R E A D I N G S. (Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Jan. 10th, 1917.

Date.	Main Fall.	Solar Radio in Vacuo.	Maxi-mum Temp. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Remarks.
Jan. 4	...	71	49	48	45	48	Cloudy
.. 5	...	57	45	39	37	39	Fine
.. 6	0.26	46	43	39	39	41	Cloudy
.. 7	...	50	47	35	34	35	Cloudy
.. 8	0.17	43	41	35	37	40	Overcast
.. 9	0.10	46	40	38	36	37	Overcast
.. 10	...	54	38	33	32	33	Cloudy

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

### EDITORIAL NOTICES.

IT is most important that communications relating to the Editorial business of THE LANCET should be addressed exclusively "To THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners. Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET should be addressed "To the Manager."

We cannot undertake to return MSS. not used.

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VOLUMES for the second half of the year 1916 will be ready shortly. Bound in cloth, gilt lettered, price 16s., carriage extra.

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To be obtained on application to the Manager, accompanied by remittance.

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The Bradshaw Lecture

or

LAMINECTOMY IN GUNSHOT INJURIES  
OF THE SPINAL CORD.

Delivered before the Royal College of Surgeons of England on  
Dec. 15th, 1916,

BY COLONEL CHARTERS J. SYMONDS, C.B.,  
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MR. PRESIDENT, LADIES, AND GENTLEMEN.—Gunshot wounds of the spinal cord form one of the most fatal groups of battle injuries. It is stated that in the Spanish-American War the mortality was 75 per cent. higher than injuries of any other region of the body. According to Surgeon-General W. F. Stevenson, 58·3 per cent. of the cases in the Boer War died, and when there was actual lesion of the cord with fracture of the arch the death-rate was 75 per cent. Many die on the field, either from the injury to the cord in the cervical region or some associated injury when other parts in addition to the spine are hit. Of those who survive to reach the base hospitals, probably the majority succumb to the effects of renal infection within a few weeks; taking the cases admitted to one military hospital—Netley—in the five months beginning July 1st last, there were 28 deaths in 43 dorsal and lumbar cases.

Of those who escape early death, some remain helpless from paraplegia, with incontinence of urine and faeces, and sooner or later die from the effects of renal infection. A few, where the trunks of the cauda equina have been injured, recover more or less power in proportion to the immediate injury. Some of these recover control of the bladder and are able to shuffle about or walk a few miles with support. There are those who, beside the paralysis, suffer pain for many months, often to an unbearable degree. Only in the concussion cases of the cord itself does any complete recovery ensue.

My object to-day is to consider how far operative methods can bring relief in these distressing cases; whether the advances in diagnosis, in technique, and in the improved opportunities for operation have enabled us to ameliorate the fate of these men. Certain of the effects of gunshot injuries are altogether beyond our help; there are others where more or less benefit may result from operation; and there are not a few where operation may prevent the onset of serious complications.

The accounts given by Surgeon-General Stevenson and by Surgeon-General Sir G. H. Makins of the South African War are not encouraging; few operations were performed and little benefit was observed. Possibly the fear of aggravating the condition led surgeons to refrain from operation where some good might have resulted. On the other hand, unsuitable cases may have been submitted to operation which now would be left alone.

The function of the cord may be destroyed in the following ways by gunshot wounds. The missile—bullet or shell-fragment—may traverse and lacerate the structure, rendering recovery to a useful extent impossible. The bullet, on account of its high velocity, may produce by a concussion effect an acute necrosis of one or more segments without actually coming in contact with the cord. Fragments of the laminae may be driven in, producing laceration and compression. The missile may be lodged in the canal external to or within the theca and continue to exert injurious influences. Extravasated blood as a compressing force does not appear to have been encountered by Makins and others in the South African campaign, and I have not found compression from this cause in those operated upon by myself and others associated with me. Extravasation into the substance of the cord has been found, and as such is unreliable by any operation.

Of the foregoing conditions, indrawn bone fragments and lodged missiles may be removed by operation. The damage inflicted so far as the cord itself is concerned cannot be undone, nor can it be mended by any surgical means. The

most that can be expected of operation is that the removal of obvious sources of irritation and pressure places the parts in a better condition for recovery. In the cauda equina, where we have to deal with nerve trunks, capable, like peripheral nerves, of recovery from bruising, and of union with restoration of conductivity, surgery holds out a more hopeful prospect.

Gunshot injuries of the spine and cord fall, like wounds elsewhere, under two heads. First, the open septic wound with fracture of the spinous processes and laminae, associated with more or less injury to the cord; and secondly, the closed wound where sepsis is absent.

OPEN AND SUPPURATING WOUNDS.

Let us consider the treatment of the open septic wounds—in other words, of compound fractures of the spine. It would seem almost superfluous to insist upon the necessity of dealing with these cases on ordinary lines as soon as possible. The fact that a fair number requiring operation reach our home hospitals leads me to think that an operation on any kind of spinal injury is considered by many as one demanding special knowledge. This is true enough where the wound has closed and a full laminectomy is required, but in these septic wounds it is seldom necessary to remove any sound bone, and the undertaking can hardly be called a laminectomy.

In dealing with these septic wounds it is most important to keep to the track of the wound, enlarging in any direction sufficiently to obtain access to its deepest part; no formal incision should be made, and when the injury is unilateral the sound side should not be interfered with. My experience is somewhat limited, but I have not found it necessary to remove a sound lamina nor to interfere with the sound half of the arch. In a case under another surgeon, however, a lamina had to be removed to permit the extraction of a fragment of shell.

Should the dura mater be found punctured or cerebrospinal fluid escape no grave consequences need ensue. If the wound be treated by the open method meningitis is unlikely to occur. It may be necessary where the dura is widely lacerated to remove fragments of bone or metal from within the theca, and yet fatal meningitis may not occur. I am strongly of opinion that these wounds should be treated after careful irrigation by loose cyanide gauze packing, or by the salt pack if preferred, and left open. Excision and closure, I believe, more often fails than succeeds, except, perhaps, in the hands of a very few. In two recent operations communicated to me there was wide suppuration, followed by meningitis and death in one. The fatal issue not occurring till the sixteenth day suggests that free drainage from the first would probably have prevented this result, even though septic shell fragments had been removed from beneath the dura. (Case 1.)

It can never be necessary to open the dura in these cases if found uninjured. Blood has not been found in sufficient quantities to cause compression, and any thought of suture of the trunks of the cauda equina must be dismissed. If intrathecal pressure is suspected a lumbar puncture, if it can be made away from the wound, should give relief. In dealing with these wounds no difference should be made between complete transverse lesions and the partial injuries; all require attention.

I cannot refrain from taking the opportunity of condemning—as a result of a fairly wide experience—the practice of excising septic wounds. Within a few hours of infliction and in capable hands the method may succeed. Of the cases arriving in Malta from the Dardanelles and those now coming from France, in the majority the attempt has failed. I could relate many disasters in wounds of the head and soft parts, and all surgeons at the base hospitals at home must be familiar with the necessity of removing sutures, opening the wounds, and releasing confined pus. It is, I am convinced, a thoroughly bad practice, and, as more harm than good results, should, I think, be abandoned. From what I have seen I would make one exception only, and that is of head injuries. Where the wound is recent, practically free from infection, and the operator understands the method of aponeurotic flap-making, I have seen some splendid results, and one has only to read the accounts of Colonel Percy Sargent, Major A. J. Hull, and others to learn what can be done; but then we are not all such skilled workers or possessed with such sound judgment, nor all Harvey Cushing's.

From amongst some recent cases I select the following examples:—

CASE 1.—In a case operated upon 13 days after the injury a large septic fragment was found impacted in the canal, requiring the removal of an additional lamina for its extraction. Two smaller pieces were also found and removed. The cauda equina was much injured and cerebro-spinal fluid escaped. The wound was excised, sutured, and drained. Sixteen days later the patient died from meningitis.

In the judgment of those responsible for the treatment of this case it had been thought wiser to delay operation until the septic condition of the wound had been reduced. The wisdom of this course is open to question, so is the closure of the wound. Major Graham Simpson, who operated, and Lieutenant H. A. Wilson, under whose care the patient was admitted, both agree in this view. One other lesson is to be learnt from this case—viz., the resistance of the spinal meninges to infection. Here was a piece of shell, foul-smelling on removal from amongst the nerve roots of the cauda, where it had lain for 13 days, and yet there were no general signs of meningitis.

FIG. 1.



CASE 4.—Showing laceration of the cord by two small fragments of shell. A piece of khaki is seen filling the upper part of the gap.

CASE 3.—Another patient was not obtained for operation till 40 days after the injury. The evacuation of several suppurating foci in the muscles, and the removal of bone fragments lying on the dura gave immediate relief to the pain in the legs which had existed from the time of the injury, and had required the almost constant use of morphia.

CASE 4.—Captain H. W. Kaye has given me notes of the findings at an autopsy made five days after the infliction of the wound. The specimen before you and the drawing (Fig. 1) show the laceration of the cord, and the embedded portions of clothing, carried in by two very small metal fragments. The cause of death was suppurative meningitis. While no permanent good would have resulted from early operation, it was nevertheless the right thing to have done.

All these observations point to the necessity of early exploration of septic wounds in direct connexion with the

spine, keeping, as far as possible, to the infected area. It will seldom be necessary to remove more than the fragments of bone to relieve the pressure or reach the missile. Excision and closure where sepsis is established lead to wide suppuration and may determine a fatal issue. It is better to pack lightly with cyanide or iodoform gauze, or to dress with the salt pack.

#### CLOSED WOUNDS.

When the wound has closed and an aseptic operation can be carried out the question of the removal of bullets and shell fragments arises. In complete transverse lesion operation is only admissible for the relief of pain. A lodged bullet or fragment may cause untold misery. Removal may render the remaining weeks or months bearable. Operation wounds heal well, and respiratory difficulties if present can be met by local anaesthesia.

Where evidence of conductivity of the cord exists, is it necessary or wise in all cases to attempt removal of lodged missiles and bone fragments? If so, should this be done as soon as the wounds have closed, or should an interval be allowed to determine how far spontaneous recovery is possible? A lodged missile may be injurious in itself, as, for example, if it lies amongst the nerve trunks of the cauda equina or if it is pressing on a spinal nerve in the intervertebral foramen. On the other hand, the depressed fragments upon which the bullet lies may be doing harm. The bullet may have penetrated, fracturing and driving in the bone. Or, again, the bullet may have passed through the canal, entering by an intervertebral foramen and become lodged in the body of a vertebra where it is harmless. It may or may not have carried in a fragment of bone. These remarks apply chiefly where the missile enters from the back. Occasionally a shrapnel bullet may enter the vertebral body from the side, and beyond giving rise to symptoms of concussion may be quite harmless.

In considering the amount of benefit likely to arise from the removal of missiles and bone fragments, one at the outset must observe that the chief cause of the damage is the striking force. This cannot be undone; we can only, as stated earlier, by removing sources of possible irritation and pressure, promote the recovery of injured structures. It may be taken as the rule that when the missile enters from behind the arch is broken and fragments are driven inwards, whether it be lodged or not. Occasionally a bullet, usually a shrapnel, but in one case to be mentioned a rifle bullet, may enter through an intervertebral foramen, without carrying in bone fragments. It is important to recognise this fact of displacement, because the X rays do not always show the fragments.

If indrawn bone be left, what injurious effects may result? This question cannot be answered satisfactorily until we possess observations made some time after the injury. I am able to contribute one such observation to-day. (Case 8.) The specimen (Fig. 5) was removed nine weeks after the injury. It shows a fragment of bone embedded in the nerve trunks of the cauda equina. The bone surrounded by new material is closely adherent to the nerve roots. The appearances suggest a progressive irritation, which must have, had the patient survived, interfered with recovery.

Thorburn in his monograph describes a case where dense fibrous tissue was found embedding the nerve roots of the cauda. Major Soutar, of the Red Cross Hospital, Netley, has communicated to me particulars of a case where the fibrous tissue was so dense that he was obliged to abandon an attempt to free the nerve roots. In a case published in the *Journal of the American Medical Association* for April last a portion of a bullet was found surrounded by two solid scars. In five cases of suppurating wounds recently operated upon at Netley fragments of bone were in two removed from within the theca, and in three from the surface of this membrane. In one aseptic operation a bullet and fragments of bone were found pressing the theca to one side. In another instance fragments were successfully removed from within the sheath, together with a small piece of shell.

The answer, it seems to me, to the two questions I have just asked, is that operation should be undertaken when evidence of continuity of the cord exists, and that the sooner it can be done after the injury the better. One presumes that care will be taken to exclude cases of concussion, and that careful consideration will be given to the general condition.

The following cases illustrate the foregoing remarks:—

**CASE 5.** Removal of shrapnel bullet.—Private —, aged 29, was hit by a shrapnel bullet in the back on August 2nd, 1916, near Albert. Eight days later, on the 10th, he was admitted to the Royal Victoria Hospital, Netley, under the care of Captain Fergus Hewat, to whom I am indebted for the notes and the accurate account of the symptoms. There was an entrance wound over the eighth left interspace four inches from the posterior median line, but no exit wound. There was retention of urine and incontinence of faeces, no voluntary movement in the lower limbs, though muscular twitchings were seen at times and the legs were noticed to move unknown to the patient. There was reaction of degeneration in the muscles of the legs, but very slight in those of the thighs. The knee-jerks were absent; pin-prick sensation was lost on the front and outer aspects of both thighs; it was retained on the outer side of the legs and dorsum and soles of the feet, and in this last situation there was hyperesthesia. The scrotum retained sensation. X rays showed a shrapnel bullet slightly above and to the left side of the spinous process of the eleventh dorsal, with evidence of fracture of this vertebra. (Fig. 2.) After a few days the retention disappeared, a catheter being no longer required; the urine passed every five to ten minutes, accompanied by straining and some pain.

When I examined this patient before operation I found a spastic condition of the limbs. At times he was seized with severe pain in the legs, and cried out so much as to disturb the others. He had also abdominal pain with flatulence, and lay mostly on his side with the knees drawn up.

**Operation** (August 27th, 1916).—From the position of the bullet as shown by the X ray it might have been deeply buried in the bone. The symptoms pointed to a severe injury to the cord with progressive destruction, and not to a complete lesion. An incision was made in the median line and the muscles detached from the left side only. The bullet was found lying between the laminae of the eleventh and twelfth dorsal vertebrae. The eleventh lamina was broken, several fragments being driven into the canal. The spinous process and the right lamina, not being broken, were left. The opening into the canal was enlarged sufficiently to give a full examination and ascertain the absence of further fragments or of projecting bone. The dura was uninjured and was not opened. The muscles were sutured, the wound closed, and a primary union resulted. No immediate or striking result was observed after the operation, and only gradually did he obtain control over the bladder and rectum.

Three months after operation (Nov. 30th) his condition is as follows: He can retain urine for three hours, and longer during the night, and can, when the need comes, wait a little time. He has control over the rectum, but owing to the approximation of the thighs and tenderness in the back he cannot use a bed-pan, nor is he able to sit up on a commode. He has pain in both legs and below the ribs on both sides as well as in the abdomen. He is free from pain for several days at a stretch, and then may require a sedative for two or three nights. He can feel cotton-wool and pin-prick over the whole of the right lower limb, but not in the left thigh, while he can feel below the knee. He can move the toes and slightly the ankles on both sides, and he has some voluntary movement in the muscles of the thighs. For the most part, however, both lower limbs are in a spastic condition, the knees held tightly against one another.

It is impossible to say how far the recovery of voluntary power over the bladder and rectum has been due to the operation and not simply to the healing influence of time. The absence of any immediate effect and the very slow improvement suggest that the damage to the cord was due to the crashing effect and to the concussion and not to continued pressure. On the other hand, it must be remembered that the bullet with depressed fragments had lain on the cord for 25 days, and that already a spastic condition had set in, with pain which at times was most severe.

**CASE 6.** Removal of shell fragment from within the theca spinalis.—Sergeant —, aged 32, was wounded outside Trones Wood on July 31st, 1916. He was admitted to Netley on August 13th under the care of Captain G. F. Holt, to whom I am indebted for the notes. The patient had multiple wounds of the back, with flaccid paralysis of both legs. A week later, when I saw him, there was some power in the sartorius and adductors of the left thigh. The anaesthesia was irregular; the knee-jerks were absent. He had sensation of pins and needles in both feet and at times the legs jumped, especially when the bladder was full, and with these movements he had fresh pain. There were retention of urine and incontinence of faeces. The X rays showed a metal fragment directly in the shadow of the centre of the twelfth dorsal, with indefinite injury to the appendages of this vertebra. (Fig. 3.) The entrance wound

was to the left of the spinous process of the same vertebra.

**Operation** (August 26th, twenty-sixth day; wound healed).—As the missile had entered from the left the muscles were detached from this side only. A large collection of pus was encountered and the track led at once to the injured lamina. After removal of loose pieces of bone and some portions of the still firm lamina, an opening in the dura was found through which the cord could be seen. On separating the nerve trunks the piece of metal was removed from the front of the cord. No cerebro-spinal fluid escaped at this time or afterwards. The wound was lightly packed with gauze and granulated up. At no time was there any sign of meningitis.

Three months after operation this man is still in bed, the incontinence of urine remains, sensation has not increased in area, though it is more acute. The power in the adductors and sartorius muscles of the left thigh has increased; but there is no gain of power in the right lower limb. He has pain, at times severe, in both big toes, extending to the instep, but nothing to that existing before operation. There is no bed-sore.

No marked result can be directly traced to the removal of the foreign body, the general all-round improvement being such as one sees where a foreign body is not lodged. There can, however, be no doubt that his prospects of improvement have been increased by the operation.

As an example of the removal of a rifle bullet by a full laminectomy from amongst the nerve trunks of the cauda equina, the following case may be related:—

**CASE 7.** Corporal — was hit on Sept. 17th, 1916, and was admitted into Netley on the 27th under the care of Lieutenant S. G. Scott, to whom I am indebted for the notes. There was an entrance wound in the back six inches to the left of the median line opposite the level of the third lumbar vertebra, but no exit wound. The X rays showed a rifle bullet, base upwards, lying in the median line, the shadow being on the body of the first lumbar and partly over the disc below. Both legs were flaccid; sensation was retained in the right thigh, and he said he could feel the wound in the right calf. The left lower limb was completely anaesthetic. There was pain in both feet, particularly in the great toes. The only motor power was a just perceptible movement in the great toe of the right foot. There was severe cystitis with haematuria, and the man was ill and somewhat wasted. The symptoms indicated a lesion of the cauda equina, and operation was decided upon at once, it being arranged to control the urine through a suprapubic opening.

**Operation** (Oct. 1st).—The laminae and spinous processes of the first and second lumbar vertebrae were removed. The theca was found uninjured, and looked broadened opposite the first lumbar. The space between the theca and bony wall was searched in front of the cord, and the bullet not being found the theca was incised. On opening the dura a small elongated clot was found extending downwards. This was followed by removing the laminae of the third lumbar. Here the cauda equina was found much torn and bruised. On separating the nerve-trunks over the first lumbar the bullet was found lying in front of these structures with its base upwards. At this point the nerve-trunks were discoloured and torn. I was unable to trace the path of the bullet, but inferred that it had entered through the intervertebral foramen between the third and fourth lumbar, turned upon itself, and passed upward to the position where it was found. The theca and muscles were sutured with catgut, the wound closed by Michel's clips without drainage, and covered with a collodion dressing, primary union resulting.

The man improved rapidly in general health; the urine cleared far more quickly than with intermittent catheterism. The pain in the feet disappeared at once, and is now only felt occasionally in the left heel. At the present time, just under six weeks from the operation, he has gained power in the hamstrings and calf muscles, but there is no return in the extensor groups. Sensation has returned to a great extent in both lower limbs.

The rapid general improvement in this man must, I think, be set down primarily to the removal of the urinary sepsis. And this has promoted the recovery of the lesion in the cord. There is still incontinence of faeces. The bladder being still drained one cannot speak of the muscular power.

The possibility of an unnecessary search being made for a bullet lying in a harmless position is illustrated by the next case, for the notes of which I am indebted to Captain D. E. Shearer. The septic infection of the urinary tract, however, rendered any operation out of the question. The specimen shows that though the bullet may reach a position where it is in itself innocuous, the broken and displaced

bone may be doing harm. And here it must be noted that the X rays do not always show these depressed fragments. It may be said on the X ray findings that the bullet having injured the cord on its passage to a harmless position, and having done its work, operation will do no good. On the other hand, a fragment of bone may have been driven into the cord and be responsible for part of the symptoms, and, remaining, prove a continual source of local irritation and of pain, this more especially when the entrance wound is behind or to one side of the spine.

CASE 8.—Private — was hit by a shrapnel bullet which entered  $\frac{1}{2}$  inches to the left of the twelfth dorsal spinous process and was seen by the X rays to lie in the centre of the body of the eleventh dorsal vertebra. (Fig. 4.) No injury to the lamina was apparent. He was hit on Sept. 15th and admitted to Netley on the 29th with flaccid paralysis of both limbs. There was sensation down the front of the right thigh, shooting pains in the legs, and a feeling as of electric shocks in the left foot. The cystitis was severe, the sacral bed-sore moderate in size. There never was a moment when operation could be considered, for notwithstanding daily attention to the bladder, pus continued to escape, indicating infection of the ureters and kidneys; the temperature remained high, reaching sometimes  $103^{\circ}\text{F}$ . The wasting was extreme. The bed-sore improved under the careful attention of the nurses. He died just under nine weeks from the injury.

At the autopsy we found that the bullet had entered between the laminae of the twelfth dorsal and first lumbar on the left side. The upper border of the lower arch was roughened but not broken, so that from an external examination it did not appear that any fragment had been driven into the cord. On dividing the bodies from the arches (Fig. 5) the bullet was found almost completely buried in the body of the eleventh dorsal a little to the right of the median line. The exposed part was so small that it could not have exerted any pressure on the cord. The bullet in its course had broken off and driven in a fragment of bone, which was closely adherent to the trunks going to form the cauda equina. Just above this point the cord was softened and semi-fluid in its left half. Many of the trunks on the right side were apparently uninjured. The bladder was black from old blood effusion, but clean, the ureters much dilated and filled with pus, the pelvis of the kidneys in the same condition, and there were suppurating foci in the cortex.

Had the general condition permitted it an operation in this case would have done some good by removing the fragment of bone, the lesion being incomplete. The specimen and the drawing show the formation of cicatricial tissue round the fragment, the cause of the pain from which the man suffered. The damage to the cord was extensive and, of course, irrecoverable, yet one may take it that had it not been for the infection of the urinary tract this man would have lived indefinitely, and some benefit at least would have resulted from removal of the indrawn bone. The bullet could have been reached without difficulty by displacing the cord. Would its removal have been necessary? The question is worth asking, for similar cases will no doubt occur. Personally I do not think it is necessary to extract a bullet in this position. Exerting no compression, the only sound reason would be the danger of meningitis from infection. This had not occurred after nine weeks, and should not arise as a result of the operation, provided no attempt were made to remove it.

#### ~~X~~ INJURIES TO THE CAUDA EQUINA.

The spinal cord terminates, I may remind you, at the lower border of the first lumbar vertebra, the lumbar and sacral nerve roots occupying the rest of the canal. These, each composed of two trunks, the one motor the other sensory, pass to their respective foramina, where the bundles unite to form the composite nerve. The separation of the two parts of the nerve trunks explains many of the irregular paralytic and anaesthetic results of injury.

Gunshot wounds may pick out particular nerve trunks, and it is possible to ascertain with exactness which have suffered. The level of origin of each being known, it is also possible to reach the injured trunk after opening the theca. Unlike the cord, these intraspinal nerve trunks correspond in structure with peripheral nerves and possess a corresponding capacity for spontaneous recovery from bruising and partial laceration. If sutured they may be expected to unite with restoration of conductivity.

The diagnosis of these lesions does not present any difficulty when confined to the nerve trunks. In estimating, however, the prognosis, it is important and more difficult to

ascertain if there be any injury to the conus. Fortunately, recovery of power over the bladder and rectum usually occurs after a time. Pain in the legs and feet may be severe and last several months.

In a young soldier (Case 3) of 19, hit on July 1st, the pain in both legs was severe; it disappeared from the right after removal of fragments of bone and metal 41 days after the injury, but was still felt at times in the left after the lapse of six months, and was then severe enough to require morphia occasionally at night. Bladder control returned in six days after the injury in this case. He remains in his seventh month completely paralysed below the knees. The wound in this man was on admission large and septic and situated over the second and third lumbar vertebrae. For the notes of this case I am indebted to Captain Henderson.

In an earlier part of this lecture I have stated my own belief that early operation should be undertaken where foreign bodies are lodged in the arch of the vertebra or where a penetrating missile has broken the laminae. The reasons apply with greater force where pressure and irritation must, if existing, interfere with the recovery of injured nerve trunks. On the other hand, seeing the amount of spontaneous recovery that takes place in bruised or torn peripheral nerves, it is urged by many that a period of some months should elapse before any operation is undertaken on the cauda equina. So far as operation is limited to the removal of indrawn fragments and foreign bodies without opening of the theca I see no reason for delay, provided an aseptic operation can be performed.

The important question arising in this part of the cord is that of suture of the nerve trunks, for in this direction lies the future of the surgery of the cauda equina. Tuffier's successful case has shown the possibility of accomplishing this result. Should suture be attempted as early as possible, and at the same time as an operation for removal of bone fragments? Or is it better to make two operations, and, if so, is the second rendered more difficult by reason of the first? Again, should all operations be postponed for some months in these cases to see how far spontaneous recovery is possible, say for six months?

Past experience will lend support to delay, and so will the result of injuries to peripheral nerves. On the other hand, if full consideration be given to the findings recorded in late operations, and to the condition found at the autopsy in Case 8, the advantage from early operation becomes obvious. Here it must be remarked that sufficient time must be allowed to elapse for the exclusion of simple concussion. The wound also may take from one to three weeks to heal, so that there will always be a fair period for observation.

One's experience at present does not provide an answer to the question as to whether an operation for removal of fragments renders one for subsequent suture more difficult. Looking, however, to the amount of new bone formed in a case to be mentioned presently, one would surmise that the opening of the theca would be less difficult, for the earlier removal of fragments would diminish the osseous formation.

While recognising the magnitude of the operation, the difficulties of working in so confined a space, of finding and suturing the divided ends, and the danger of inflicting further injury, I believe it will be wiser to undertake operation as soon as all things are favourable. Unfortunately, in most of these cases arriving in England urinary infection and bedsores render operation impossible for many weeks. The prevention of urinary infection becomes a most important matter, and I hope, if time permit, to indicate a method by which this destructive complication may be met.

Cauda equina injuries have been comparatively common. I have notes of seven cases admitted into one hospital within six months. Though they all vary a good deal as to symptoms, there was no difficulty in recognising the lesion, and recovery was satisfactory up to a certain point. The following case is an example.

CASE 9.—In this case, under the care of Captain E. G. Smeed, there was complete flaccid paralysis, retention of urine, with incontinence of faeces. For many weeks the man's life was despaired of from urinary infection, septicaemia, and bedsores. He had double acute parotiditis and right panophthalmitis. At the end of  $1\frac{1}{2}$  years he is able to get about in a wheeled chair, and his general condition is excellent. There is complete paralysis of all muscles below the knees, those of the thigh being good. He can retain urine for three hours, while the rectal control is uncertain.

FIG. 2.

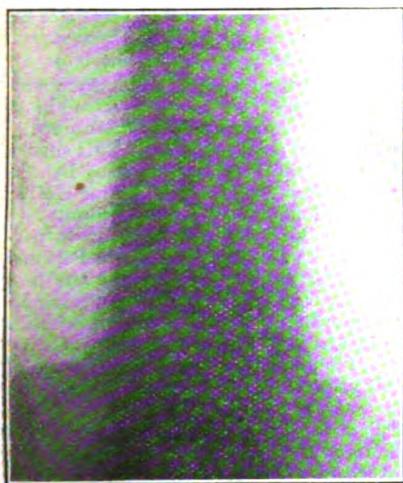


FIG. 3.



FIG. 4.

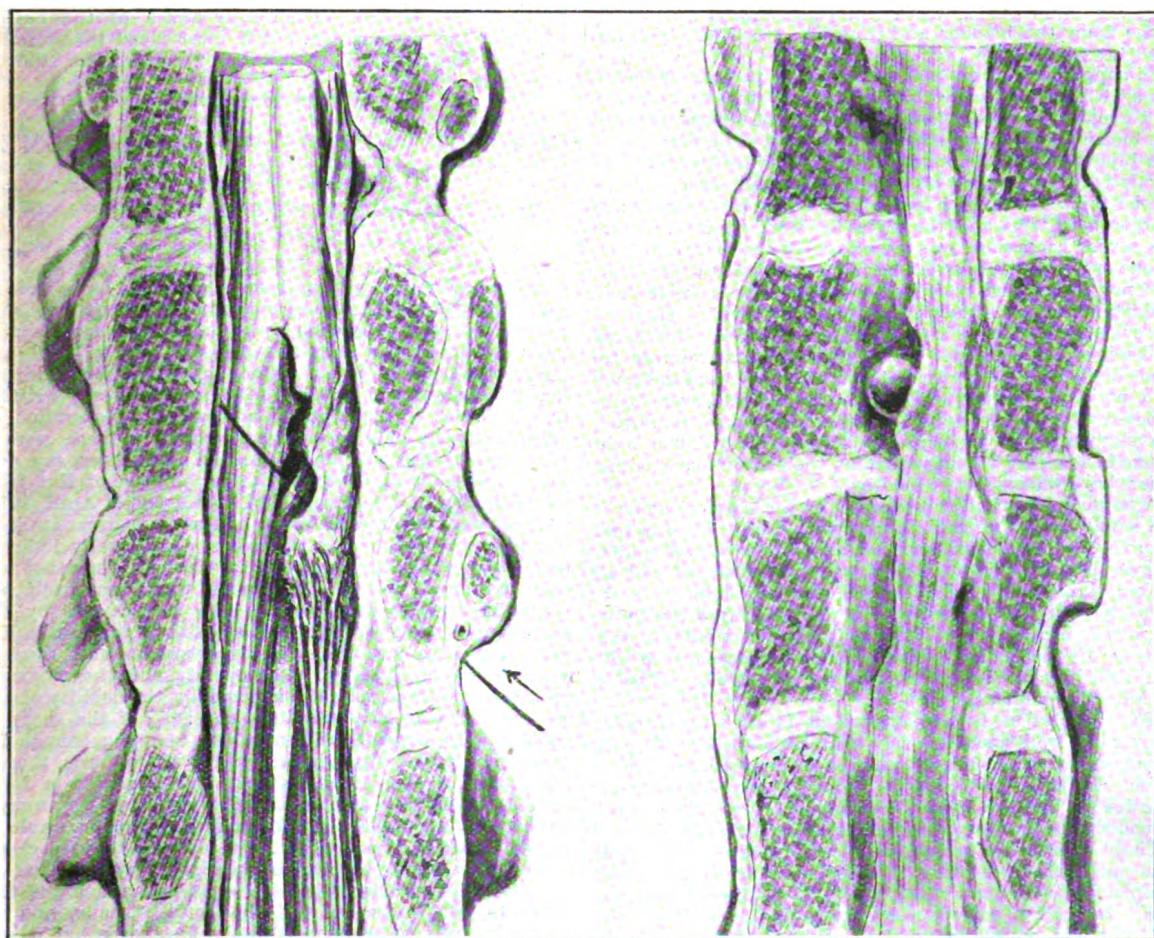


CASE 5.—Shrapnel bullet, with fracture of the left lamina of the eleventh dorsal vertebra.

CASE 6.—Shell fragment amongst the trunks of the cauda equina; level of twelfth dorsal vertebra.

CASE 8.—X ray showing position of shrapnel bullet.

FIG. 5.



CASE 8.—The bullet embedded in the posterior wall of the eleventh dorsal vertebra is made in the drawing to project too far. The irregular mass to which the nerve trunks are attached is the piece of indrawn bone. The course of the bullet and the laceration of the cord are also shown.

The bullet entered the ilium  $1\frac{1}{2}$  inches below the crest and passed through the fifth and fourth lumbar vertebrae. A sinus existed for more than a year, discharging small crumbs of bone from time to time. There is a marked enlargement from new bone formation about the fourth and fifth lumbar vertebrae.

While I have no doubt that, had the patient's condition permitted, an operation would have been wise soon after the injury, I have not sufficient experience to decide whether, after an interval of 18 months, an attempt to restore the continuity of the sacral nerves would be successful.

#### INJURIES TO THE CERVICAL SPINE.

My notes of ten recent cases, some from the Royal Victoria Hospital, others from the Welsh Hospital (the latter through the kindness of Lieutenant-Colonel Cook and his staff), together with several observed in Malta, show the remarkable tendency to recovery in those cervical injuries which reach our hospitals. In the higher lesions and those which are complete about the level of the fourth and fifth cervical vertebrae the patients either are killed outright or die early.

In one case a flat fragment of copper was embedded in the transverse process of the fourth cervical and was removed. There was considerable injury to the process and to that of the fifth, together with fracture of the bodies. Captain W. M. Howells, who made the X ray examination, thought there was probably a fracture dislocation.

CASE 10.—This young soldier (Private —) was wounded on Sept. 9th and lay in the open two days. He was admitted to Netley under Captain Newman Smith on the 17th with a septic wound in the neck behind the right sterno-mastoid; no exit wound. There was complete paraparesis of the right arm and leg with loss of sensation, partial loss of power of the left arm and leg with loss of sensation, retention of urine, and incontinence of faeces. The wound was opened up, drained, and the metal fragment removed. He survived three weeks, death being accelerated by haemorrhage from the bladder and from the track of a perineal drainage operation.

In none of the others was there any impaction of metal, though fragments were to be seen in the soft tissues. In three the X rays showed injury to the lateral mass of the fourth and fifth vertebrae or fifth only. In four others the injury was in the same region. All these patients had paraparesis of varying extent. In one the right arm and leg on the injured side, with loss of sensation on both sides; in another both arms and the right leg were affected. In all the severe cases there was retention of urine for a few days, in one only there was severe haemorrhage and cystitis. Time will not permit the record of the symptoms more than to indicate that the lesions were severe, as shown in eight by the evidence of paraparesis, &c., and in several by the X ray evidence of bone injury. One patient, the first referred to, died chiefly from haemorrhage from the bladder and the track of a perineal puncture. The cystitis, always severe, contributed to the fatal result. All the others have improved, the slighter cases rapidly, the severe slowly. The most severe is now just walking about at the end of four months, others have walked in two months.

A notable feature about wounds of the cervical spine is the small degree of cord injury when compared with that occurring in the dorsal and lumbar regions with a similar degree of bone injury. The transverse processes will be broken, a fragment of shell lodged and buried in the arch, even the body of the vertebra broken, and yet the nerve injuries be recoverable. The mobility and flexibility of this section of the spinal column, and in consequence the diminished resistance offered to the projectile, probably explains the difference.

The conclusion I have arrived at is that these cases recover so well spontaneously that unless there is pain from pressure on the nerve trunks it is wiser to leave them alone. In this view I may be wrong; it may be a sounder practice to remove loose fragments early, and a more extended experience may lead one to change this opinion.

Those who favour operation in cervical cases must admit that spontaneous recovery in many cases is so rapid and complete that too much may easily be attributed to operation. In such a case as that report by Major Hull<sup>1</sup> the recovery was unusually rapid, a definite improvement in sensation being observed the next day; and the patient had

recovered the use of his paralysed leg within three weeks. A depressed fragment of bone lying upon the theca was removed. It may certainly be admitted that the rapid healing of the wounds, the slight amount of shock, and the comparatively short duration of the operation justify more frequent resort to interference.

#### CONCLUSION.

With regard to the details of the operation of laminectomy I have nothing particular to say. They will be found most conveniently in Major Hull's "Surgery in War," where will also be read the best summary of recent progress. This should be amplified by reading the paper just referred to by the same author. I may add, however, that, unlike Major Hull's, my operations have been done under ether without any anxieties, but then we have had the advantage of a particularly skilled anaesthetist in Captain J. S. Steele-Perkins. One other point is worth referring to. Removal of the first lamina is the only difficulty, and can be met by applying an inch trephine after removal of the spinous processes. Trepanning the spine is, after all, the name used by Larrey and the older writers. I am indebted to Major Soutar, of the Red Cross Hospital at Netley, for this suggestion, and commend it to others.

I cannot claim, Mr. President, to have brought before you any brilliant successes or any new method. Rather is the attempt to deal with these distressing cases disappointing. I hope, however, in summarising a somewhat limited experience I may have indicated the comparative safety of laminectomy carried out under the best conditions, and emphasised the necessity of dealing promptly with septic compound fractures of the spine on ordinary lines, avoiding unnecessary incisions, removal of uninjured bone or opening the uninjured theca. The observations I have brought before you of the comparatively slight risk of meningitis in septic wounds when treated by the open method may, I hope, be of service. I am fully aware of the hurried nature of the composition, but I must plead the exacting nature of duties that have left but little time for study or investigation.

## GUNSHOT WOUNDS OF THE ABDOMEN DURING THE SIEGE OF KUT.

BY C. H. BARBER, M.R.C.S. ENG., L.R.C.P. LOND.,  
MAJOR, I.M.S.

SINCE my recent return from Bagdad I have had an opportunity of reading the several excellent papers published on the subject of penetrating wounds of the abdomen, notably those by Fraser and Bates in April last, and by Webb and Milligan in October. It is therefore now with some diffidence that I venture to add another to the number already written. But it seems to me that the advisability of operation on principle as the only reasonable treatment in these cases is still perhaps not sufficiently realised. Moreover, my own cases, practically all occurring during the siege of Kut from the beginning of December, 1915, to the end of April, 1916, were treated under exceptional and adverse circumstances. For instance, the wounds themselves were usually inflicted by a slower and larger bullet (about .400 inch) than that met with in Europe, so that the damage to the gut itself was presumably rather more severe than that caused by the smaller high-velocity missile. The health of the men in Kut grew progressively worse as the siege wore on, until towards the end one often hesitated to operate, and the prognosis after operation was seriously affected by the debility of the victims. The hospital buildings consisted of the shops or cubicles of a covered Arabian bazaar, each big enough for about four patients on the ground or two on beds, though beds were scarce. Besides these we occupied a large number of Arab houses, some of which had two storeys, but most of them were mud-brick dwellings comparable to Indian servants' quarters and very difficult to keep clean. Our fine new wooden hospital, with its large airy wards, which we had built just before the siege began, was almost the first thing to get in the way of the Turkish shells, and we had regretfully to abandon it in the first week, but it was almost a case of out of the frying-pan into the fire. The operating-room was also a mud-walled dungeon, with a large hole in the roof to admit light; in wet weather this

also admitted rain. To give proper nursing and suitable after-treatment was not easy, and the fact that the hospital was generally under shell- or bomb-fire once or twice a day did not add to the comfort or mental repose of its inmates. Such recoveries, therefore, as occurred after operation—and there were practically none apart from it—may be looked upon as the minimum number possible under this method of treatment; but to my mind they are sufficient to indicate the value of operation, and indeed to show that wounds of the abdomen involving the intestines should always be so treated. A further point of interest lies in the fact that owing to the small size of Kut and the proximity of the hospital to the trenches many of my cases were obtained within a few minutes to an hour of their being hit, so that they include a class of case which as a rule never reaches a hospital at all but dies on or near the field. Several of the cases were amongst soldiers or civilians who were hit in the town or on the river bank, close to the hospital, by snipers.

After South Africa the general impression left on surgeons' minds was that penetrating wounds of the abdomen involving the peritoneal cavity and its contents were best left alone, and indeed one excellent text-book went so far as to say that by this method 40 per cent. of cases recovered. But these figures, it is probable, are based on official records from admission- and discharge-books, in which gunshot wounds of the abdomen include all wounds, flesh or otherwise, in the abdominal region, and are useless for purposes of comparison. Makins saw no case recover in South Africa in which the small intestine was injured. Such operations as were performed were usually unsuccessful.

Laurent, from his experiences in the Balkan wars, preserved rather an open mind on the subject of the treatment of these wounds, but went so far as to advocate laparotomy when this could be done early, especially in the first six to eight hours, and certain Bulgarian reports seemed to confirm this. They stated that one advantage of early operation is that it may save some who would otherwise die of haemorrhage—a very important point. Lucas-Championnière, Reclus, Bozzi, and others advised conservatism unless operation could be performed early in a modern hospital. Kahn, writing in 1913, from experience in civil practice, says: "In every case of penetration of the abdomen by a bullet, multiple perforations of the viscera are to be assumed and prompt surgical exploration is demanded."

La Garde says: "It would seem to have been proved that the abdomen may be traversed by a missile without perforating hollow viscera, but perforation is the rule," and also that some cases recover spontaneously in spite of perforation. He quotes the case of Major Thornton, of the United States Army, who had 18 wounds of the intestine, but no complete perforation. He submits that the natural redundancy of the mucous coat, which fills the wound like a hernia, may prevent the escape of gas and faecal contents. He, however, comes to the conclusion that exploratory operation should be performed when environment permits.

In the early days in France nearly all these cases died, whether operated on or not. They were usually not received for many hours. Up to early in 1915, 85 per cent. of cases died by the time they reached England (Wallace). Schnieden states that spontaneous recovery is exceedingly rare, whilst recovery after operation was 27 per cent.

Up to the summer of 1915 the majority of the German surgeons at Lille advocated conservative treatment, but opinion was then changing. Demmer, writing in 1915, also advocated conservatism and gave a death-rate of only 24 per cent., but fuller particulars of these cases would be required before accepting them as perforating wounds. Friedrich gives interesting figures. 85 per cent. of cases treated without operation died within two days. Of those that reached the home hospitals (i.e., after two days), 38 per cent. died. Under conservative treatment the prognosis improved the higher up in the abdomen the wounds were inflicted, the best being in stomach and liver cases. Enderlen gives 30 per cent. recoveries after operation. Early in the present war he had operated as late as 18 to 24 hours after the wound occurred, but invariably found purulent peritonitis without adhesion of the abdominal organs or any sign of a mucous plug in the perforations. Prolapse cases ended fatally. Sauerbach endorsed the policy of operation in abdominal wounds and claimed 42.5 per cent. Korte states that the length of time that elapses before operation is the important factor; after

12 hours the prognosis is bad, especially if the case has been transported over rough roads.

Morley, after his experience in Gallipoli, writes: "It can generally be assumed where the wound of exit like that of entrance is the typical small puncture of the modern rifle bullet that the bullet will have drilled through the intervening viscera, causing holes no greater than in the skin, and that the redundant mucosa of the stomach or intestine will plug up the holes and prevent the escape of the contents, until plastic adhesions have completed the healing process." This to me is an astonishing statement, as all my experience went to show that the nature of the wounds gave little or no indication of the amount of the damage internally. Morley therefore adopted a routine treatment of morphia, Fowler position, and giving nothing by the mouth for 24 hours, with saline when necessary subcutaneously. Operation was undertaken if sufficiently obvious. In wounds inflicted by shell or shrapnel he advocates operation.

Mayo Robson, at the end of 1915, wrote that a clean bullet wound through the abdomen with small wounds of entry and exit and without evidence of internal haemorrhage or extravasation may, if favourably situated, be treated expectantly. But the trouble is that internal haemorrhage and extravasation may give no evidence until too late. He thought operation well worthy of consideration if early and the patient fit and in suitable surroundings.

Fraser and Bates, in their illuminating and conclusive paper, come to the conclusion that in the vast majority of cases of penetrating wounds of the abdomen operative measures offer the best chance of success, but qualify their statement by excluding from that category uncomplicated wounds of the liver and certain wounds of the kidney. My own experience is in almost entire agreement with theirs, and their interesting drawings depict conditions of the gut that were met with in very many of my cases.

Webb and Milligan would operate on most cases, but not at once on principle. They do not operate where there is doubt as to penetration, when the liver or the kidney alone is involved or when the case is moribund. They give a full account of their methods of examination and of the clinical signs one meets with in these cases. With them Crisp English is in agreement, but excepts also a diaphragmatic group with extensive injury to the lower chest and upper abdomen. He often postponed operation in shock and haemorrhage cases. He states that spontaneous recovery is a very rare event and that wounds of the central and lower abdomen are fatal if left alone.

My own experience of some 90 cases, together with particulars supplied by my colleagues of a dozen more, has led me to conclusions which agree in the main with those expressed in the last three papers. In 10 months of the early part of the war, between November, 1914, and October, 1915, only 10 cases of penetrating abdominal wounds among the Indian troops arrived at the base hospital at Busra, to which all cases came—that is to say, the other cases died within a day or two. Of these 10, nine died, whilst the tenth was transferred to India, and I am ignorant of his fate. It was a case with an entrance wound only, and it is quite likely that he would require an operation later for faecal fistula. None of these cases was received within 20 hours of injury, and some of them had been wounded for a much longer time; none was operated on. Similarly, of the 44 Kut cases that were not operated on, 41 died, and of the three that survived two were "liver only" cases. The third (Case 22) was a lower abdomen case, and the only one I have seen recover without operation. These figures are sufficient to emphasise the appalling mortality of abdominal wounds in the lower part of the belly and the urgent need for active treatment. By "lower part" I mean any portion below the transpyloric plane, which serves as a rough guide. "Operation on principle" refers to this part. It had always seemed to me that these cases should be treated as acute abdominals, and that operation held out the only reasonable hope of recovery, provided that they could reach a stationary hospital before serious peritonitis set in. The investment of Kut provided an unusually good opportunity of getting these cases within a very short time after they were wounded. Colonel Patrick Hehir, C.B., was good enough to arrange that all abdominal cases should be sent at once to the General Hospital whenever this was possible, with the result that many of them were admitted within from 15 to 60 minutes. Thirty were admitted within an hour of injury.

Many of these, of course, were cases such as ordinarily die on the field of battle and do not reach a hospital at all, but one or two were saved who would otherwise have died from haemorrhage or who would have been beyond hope of operation by reason of haemorrhage had they been admitted later. Herein lies the importance of immediate operation unless one can be reasonably sure that serious haemorrhage is not taking place. By serious haemorrhage is meant bleeding rapid enough either to be fatal within a few minutes or so to reduce the strength of the patient in an hour or two as to contra-indicate operation. If one can be reasonably sure, then it is obvious that anti-shock measures and time given to the patient to recover from the shock of his injury are of paramount importance, since leaving him for five or six hours does not, I think, add seriously to the risk of severe peritonitis. But I have found it sometimes extremely difficult to be sure just when to leave patients, for the changes in the pulse may not be at all alarming, and may fall very far short of what one is accustomed to appreciate as a bleeding pulse long after the bleeding has gone on to a dangerous extent, when the effect of the operation is added thereto. Unfortunately, a large number of these cases do bleed, and there seems to be little or no tendency for the haemorrhage from ruptured vessels in gut or mesentery to stop. Several times I have been astonished on opening an abdomen to find a large quantity of blood in the peritoneal cavity such as one would have thought would have had a very definite effect on the pulse, whereas a very few beats above the normal has been all the evidence obtainable. Moreover, I am inclined to think that the shock of opening the abdomen and consequent exposure of the intestines to the air, whether Yandell Henderson's CO<sub>2</sub> theory be correct or not, is considerably accentuated after even moderate bleeding, and this has to be taken into account before deciding to wait.

As regards the question of operating on these abdominal cases or indulging in expectant treatment, I would operate on all cases of penetrating wounds below the transpyloric plane as a routine method, provided, of course, that the patient be considered fit enough to stand the operation. The length of time that may be allowed to elapse before operation will vary with the condition of the patient and the existence or probability of haemorrhage. If there is bleeding operation must be undertaken at once; if not, it is permissible to wait up to 8 or 9 hours. It is doubtful if, as a rule, operation is worth while after 12 or 14 hours have elapsed. Of 9 cases operated on after 12 hours or more, only 1 recovered. Of the 98 cases I am able to quote 42 were operated on, with 10 recoveries. 90 of the cases were wounds below the transpyloric plane, and of these 40 were operated with 9 successes. Of the other 50 one lived, one was awaiting operation just before the end of the siege, and the fate of the third is doubtful. These successes represent the minimum number possible. Under better conditions more would have lived. I have no doubt also that operating on several of the bleeding cases was of the nature of a forlorn hope, and I now feel that some of the others might have been all the better for more prolonged anti-shock treatment, but this was difficult to give. Of wounds above the pyloric plane 2 were operated on with one recovery, and of the 6 unoperated on 3 lived. Of these 2 were "liver only" cases, and in the third the bullet just skimmed the under surface of the same organ (Case 88).

The cause of death in the majority of cases was a combination of haemorrhage and shock; many died from the former alone. Those that survived the first two days died from peritonitis. Three died from this cause after operation. No case developed gas gangrene or spreading cellulitis. The amount of damage done to the intestine is practically always serious and varies greatly from one or two holes or rents to a dozen or more.

Clinical signs and symptoms are not a reliable guide to the extent of the lesions (*vide* Cases 7, 60, 15, 18, 20, 24, 25, 30, 35, 41, 42). Usually there are several holes or rents of all sizes from a threepenny-bit to a longitudinal rent several inches in length. I have only once seen a very small hole that might presumably have been occluded by natural means, and then it was not the only one; the average hole was about  $\frac{1}{4}$  to 1 inch in diameter, with thick pouting everted lips of contused mucous membrane. Fraser and Bates's pictures show the condition exactly. Sometimes the gut is almost completely severed as if it had been roughly cut; sometimes there are several holes or rents close

together, and when this happens resection is the only remedy. The mesentery was nearly always holed or torn and smaller or larger vessels generally involved and bleeding; the severed walls of the gut always bleed steadily.

Extravasation of intestinal contents had always taken place in greater or less quantity, that from the large bowel having a strong odour. In one case a round worm, 8 inches long, was found free in the peritoneal cavity. In wounds above the pyloric line the liver, stomach, and spleen are the viscera affected. Wounds of the liver are not necessarily very serious; a clean drilled hole through the organ soon heals up, whilst a gaping rent of moderate size is easily stitched up; moreover, haemorrhage from it tends to stop (Case 87). Wounds of the stomach are serious, and extravasation of its contents into the lesser sac is likely to occur as a complication, otherwise it is reasonable to suppose that small holes made in a single viscus whose walls are closely applied to solid structures might possibly become occluded naturally. The appearance of the external wound, unless very large, gives no information regarding the extent of the damage inside. Many of my cases had small external wounds co-existent with extensive lesions in the intestines.

As symptoms and signs, more or less pain is almost invariable, but I have seen one or two with practically none. I think it is less marked, as a rule, when there is much blood in the peritoneal cavity, bathing the torn tissues. Pain seems likely to be more severe with injuries low down in the pelvis. Vomiting is as often absent as present; rigidity and tenderness are almost always present; type of respiration varies with amount of rigidity. There is always more or less shock, but it, again, is not a reliable guide to the damage. The facies is, of course, a valuable indicator of shock and haemorrhage, but the pulse is the most important of all—its rate, and especially any increase in rate after a short interval, are the most important indicators of haemorrhage. Dullness in the flanks is seldom appreciable before the dangerous stage of haemorrhage is reached, and so is of little value. Distension is not present in the very early stages, but comes on later. Haemorrhage from the wound on meddling with it will sometimes give indication of the kind and extent of the bleeding. It is sometimes very difficult to decide whether penetration has occurred or not; the doubt should be cleared up by exploring the wound with the finger, first iodining the wound and enlarging it if necessary.

Little need be said on the subject of the operation. I used the most convenient incision in each case. Blood and contents obscuring the view are mopped up as quickly as possible. If the track of the bullet is accurately known examination of the whole length of the intestine is not always necessary and is inadvisable on account of shock. When the extent of the damage is known holes and rents are stitched up, by purse-string when very small, by through-and-through and Lembert when large; often, when hurried, I have used only one row of Lembert with no untoward result. After resection, end-to-end suture, but I have no doubt lateral anastomosis is better for the avoidance of post-operative gut paralysis. Resection appears to add considerably to the shock of operation. The peritoneal cavity is then cleaned and drained by a large  $\frac{1}{2}$  inch rubber tube from the recto-vesical pouch to the lower end of the incision; possibly also by an extra tube locally. The Trendelenburg position was often found useful. Chloroform was the only anaesthetic.

As post-operative measures the head of the bed was raised; salines were given if necessary; water by the mouth after 12 hours, milk-and-water after 24. Good nursing was badly needed. Distension usually occurred, but generally disappeared by the third day; when it did not, turpentine stupes and small doses of mag. sulph. usually defeated it. Slight bronchitis often caused trouble.

The following are brief notes of the cases.

CASE 1.—Sepoy, Infantry; bullet. Admitted Dec. 14th, 1915, 8 hours after injury. Entrance wound in right flank just above iliac crest; no exit; hit just after taking food. Condition: Pain considerable. Abdomen rigid and tender. Pulse fair in quality and slow; shock moderate. No history of vomiting. Operation. Laparotomy 10 hours after injury. Incision parallel to fibres of external oblique. Large quantity of intestinal contents free in peritoneal cavity. There were two large holes in the small intestine near each other on opposite sides with everted edges. No chance of natural occlusion. These were closed by purse-string sutures. Bullet

not found. Result: Recovery. Had some griping pains after getting on to light diet.

CASE 2.—Driver, Mule Corps; bullet. Admitted Dec. 18th, 1915. Wounded same day. Entrance wound small; 2 inches above middle of left Poupart's ligament; no exit. Bullet palpable in left buttock near middle line, low down. Condition fair; pain moderate. Abdomen rigid and tender. No history of vomiting. Operation about 12 hours after injury. Incision 1 inch to left of middle line. The peritoneal cavity was full of bloody urine, with commencing peritonitis. There was one wound in the bladder, which was stitched up. No other intra-peritoneal wound. The peritoneal cavity was swabbed clean and drained at the lower angle of the wound from the recto-vesical pouch. Shock very considerable. Result: Died. Abdomen remained distended. Urine passed naturally but stools contained blood. No temperature. Death from exhaustion and peritonitis on sixth day.

CASE 3.—Sepoy, Punjabis; bullet, on Dec. 20th, 1915. Admitted 18 hours after injury. Entrance wound over left hip; no exit. Condition: Considerable pain in abdomen, also behind right trochanter. Abdomen stiff and tender. No history of vomiting. Not operated on. Urine drawn off clear early on 21st. Result: Died on 22nd.

CASE 4.—Cook, Indian General Hospital; shell wound. Wounded Dec. 13th in hospital and seen at once. One wound lower part of abdomen. Condition: Shock moderate. No vomiting. Much pain and tenderness. Rigidity slight. No signs of bleeding. No dullness in flanks. Pulse-rate not appreciably increasing. Operation 3½ hours later. Pararectal incision. Good deal of blood in peritoneal cavity and bleeding still going on from mesenteric vessels. Several holes in small intestine which were stitched up by Lambert sutures. Segment of shell found resting in recto-vesical pouch. Peritoneal cavity cleaned and drained. Result: Died next day from shock and haemorrhage.

In this case operation was delayed a little to enable the patient to recover from the shock, but unfortunately, as so often happens, small mesenteric vessels continued to bleed and jeopardised his chances. An earlier operation would have stopped this, with perhaps a different result.

CASE 5.—Sepoy, Pioneers; bullet. Admitted Dec. 20th, 12 hours after injury. Entrance wound just to left of umbilicus; exit behind left flank. Rough journey to hospital. Condition: No notes. Operation about 14 hours after injury. Gut very badly damaged with bleeding from mesenteric vessels. Large amount of blood in cavity. Resection of 12 inches of small intestine. Peritoneal cavity was full of intestinal contents. Result: Died same evening, haemorrhage and shock.

CASE 6.—Syce; bullet. Admitted Dec. 13th, 1915, 20 hours after injury. Lower half abdomen. No operation. Died Dec. 16th from peritonitis.

CASE 7.—Sepoy, Mahrattas; bullet, .377 uncased. Admitted Dec. 24th, 1915, five hours after injury. Entrance wound left buttock near middle line. Bullet could be felt subcutaneously 2 inches to left of umbilicus. Condition good, not much pain; some tenderness and rigidity. No note of vomiting. Facial expression normal. No signs of bleeding. Pulse and respiration unaffected. Operation one hour later, median incision. Peritoneal cavity was full of intestinal contents and very dirty. There were five holes in the small intestine, which were sewn up and the peritoneal cavity cleaned and drained. Result: Uninterrupted recovery; some hiccough on third day.

CASE 8.—Water-carrier; bullet. Admitted Dec. 28th, 1915, within two hours of injury. Entrance wound left flank. Exit same level 2 inches to right of umbilicus. Condition: Very pale and collapsed; no pulse. Operation not indicated. Result: Died within few hours.

CASE 9.—Sepoy; bullet. Too bad for operation; did not recover from shock and died next morning, Dec. 11th, 1915. Lower abdomen.

CASE 10.—Cook, Rajputs; bullet, lower abdomen. Admitted Dec. 11th, within two hours and died same day; too bad for operation.

CASE 11.—Arab coolie; bullet. Admitted Jan. 8th, 1916, within an hour of injury. Entrance wound somewhat large and ragged in left flank two inches above iliac crest; small piece of omentum protruding; no exit. Condition good, pain considerable. Tenderness and rigidity on right side of abdomen. No vomiting. No signs of bleeding. Operation two hours later. Incision transverse, muscle splitting, wound excised. There was some extravasation of the contents of the large bowel. Three holes in the descending colon stitched up and the peritoneal cavity cleaned and drained. Owing to condition of patient the operation was hurried. Bullet not found. Result: Next day abdomen was soft, but slightly distended and tender, but pulse fairly good. Vomited twice. Next day he was given solid food by his relatives, but nevertheless made an uninterrupted recovery and was running about in three

weeks. He returned to full coolie work towards the end of March.

CASE 12.—Sepoy, Infantry; bullet. Admitted Dec. 19th, 1915, 24 to 36 hours after injury, lower abdomen. No operation; died next day.

CASE 13.—Sepoy; bullet; pelvis. Admitted Dec. 15th, 1915, about 48 hours after injury. No operation; died next day.

CASE 14.—Driver; bullet, lower abdomen. Admitted Dec. 13th, 1915, about 20 hours after injury. No operation; died next day.

CASE 15.—Dhooly-bearer, Field Ambulance; large Arab bullet. Admitted Jan. 1st, 1916, 2½ hours after injury. One wound only in left flank, mid-axillary line, just above crest of left ilium; no indication of direction save that he was standing up when hit. Considerable pain, right half of abdomen rigid and tender; no vomiting; bleeding probable. Operation one hour later. Incision in direction of external oblique, internal oblique split. There were several large holes in the small intestine, plus a rent in the mesentery, from the vessels of which considerable bleeding was taking place. The vessels were tied, two holes closed by Lambert sutures, and a piece of badly injured gut where there were three holes close together was resected, the ends of the intestine being joined by end-to-end anastomosis. Patient had lost a good deal of blood, and there was much shock. The bullet was not found. Rectal salines were administered. Result: Next day abdomen not distended, but somewhat rigid and tender; large amount of sanguineous fluid drained away; did not recover from shock and died at 2 o'clock.

CASE 16.—Lance-Corporal, Infantry; shrapnel wound abdomen and both arms. Admitted Jan. 15th, 1916, wounded about 4 P.M., seen two or three hours later. Entrance wound just to left of umbilicus, exit left buttock. Condition fair, bleeding doubtful. Operation, 8 P.M. Bleeding from torn vessels in pelvic mesocolon; four large holes in small intestine sewn up, and one in mesocolon; abdominal cavity cleaned and dried. Track of bullet went through iliopsoas just external to external iliac artery and through ilium. Wide patent track through buttock to external wound. Patient took anaesthetic badly, stopping breathing several times, and vomiting strenuously at end of operation. Result: On 16th abdomen still stiff, not distended; fair amount of sanguineous discharge. Good deal of pain. Pulse rapid and poor. No vomiting. On 17th abdomen softer and patient looking well, but died suddenly of heart failure at 2 P.M.

CASE 17.—Sepoy, Punjabis; bullet. Admitted Jan. 21st, 1916, one hour after injury, in very bad condition from shock and haemorrhage; vomited coffee-ground material half an hour later. Entrance wound left side of back over tenth rib; exit left side of epigastrium. No operation; died during night.

CASE 18.—Sepoy, Punjabis; bullet. Admitted Jan. 21st, 1916, about one hour after injury. Entrance wound 3 inches to right of spine at level of costal margin; exit just above costal margin over tenth rib, the cartilage of which was broken; omentum protruding. Condition not good; bleeding doubtful. Operation an hour later. Two wounds in hepatic flexure and two in liver stitched up. Good deal of blood exuded from liver. Result: Died 24 hours later.

CASE 19.—Sowar, Cavalry; bullet at long range. Admitted Jan. 21st, 1916, within an hour of injury. Entrance wound small, in left hypochondrium; no exit. Condition bad; blanched, very cold, and restless; pulse imperceptible at wrist. Abdomen moved freely but was somewhat distended; no dullness in flanks; no vomiting. No operation; died in half an hour from shock and haemorrhage.

CASE 20.—Lance-Naick, Mule Corps; bullet, at long range. Admitted Jan. 21st, 1916, about an hour after injury. Entrance wound left flank; no exit. Condition bad; bleeding probable. Operation within an hour. There was one rent in the small intestine 2½ inches long in the long axis of the gut and two other smaller ones. The mesentery was torn and its vessels bleeding. All were stitched up. Result: Died during the night; shock and haemorrhage.

CASE 21.—Private, Infantry; bullet. Admitted Jan. 21st, 1916, about seven hours after injury. Entrance wound right buttock, near middle line; exit midway between umbilicus and pubes, ½ inch in diameter, slightly to right of middle line. Condition: Very little pain. Abdomen rigid; pulse fair; no vomiting; urine clear. Treated expectantly. Next day some vomiting, otherwise condition unchanged. On the third day the abdomen was softer and almost painless, but slightly tender in the left iliac region, and he looked in fair condition, but he was vomiting bilious matter and his pulse was almost imperceptible at the wrist. He died later in the day. There is no doubt that this case should have been operated upon, and I regret I did not do it.

CASE 22.—Sepoy, Punjabis; bullet. Admitted early in December, 1915. Entrance wound left side back over tip of twelfth rib cartilage. Bullet extracted from abdominal wall 1 inch internal to and above right anterior superior iliac spine. There was much pain in the abdomen and in the sole of the right foot. There was no vomiting and never any blood in the stools or urine, but he passed urine with difficulty. There was paralysis of the left leg. This man recovered; he had no further abdominal symptoms, but his paralysis persisted with only very slight improvement.

*Note.*—This is the only case of a penetrating wound below the pyloric line that I have seen recover without operation, and even in this case it is possible that the bullet passed along beneath the fascia covering the psoas and illacus. I count it, however, as a perforating wound.

CASE 23.—Arab girl, aged 8 years; bullet. Admitted Jan. 27th, 1916, about one hour after injury. Entrance wound right side epigastrium, small; exit just below costal arch 1 inch outside left nipple-line, 1 inch in diameter; omentum and about 12 inches of colon extruded. Condition fair, but restless and frightened; probably bleeding. Operation one hour later; one hole in splenic flexure, one large and one small hole in stomach. Under surface of liver torn. Bleeding vessel in stomach wall. Good deal of blood in peritoneal cavity. Result: Died same night, haemorrhage and shock.

CASE 24.—Rifleman, Gurkhas; bullet, probably large. Admitted Feb. 2nd, 1916, about three hours after injury. Entrance wound right hip at tip of great trochanter; exit 2½ inches to left of umbilicus, large and lacerated, 2 inches in length. Condition fair, but evidence of bleeding; pain severe, some tenderness in abdomen. Operation: Median incision; much fresh blood in peritoneal cavity, from branch of superior mesenteric in torn mesentery. Six holes in small intestine, three large and three small. Result: Recovery; vomited twice during night; next day abdomen slightly distended. Third day, abdomen normal and not tender; troublesome cough, otherwise uninterrupted convalescence,

CASE 25.—Driver; bullet. Admitted Feb. 2nd, 1916, 2½ hours after injury. Entrance wound 2½ inches to left of umbilicus; no exit. Condition: Blanched, not much pain, but complained of pain and tenderness on right side of abdomen. Pulse small and increasing slowly in rate. Operation three hours later. There was a large quantity of blood in the peritoneal cavity; a large rent in the mesentery near the ileo-cecal junction; the bleeding was coming from the ruptured ileo-cecal artery. There were eight holes in the small intestine and one in the cæcum; all sewn up. Patient very collapsed. Rectal salines, &c. Result: Died shortly afterwards; death due principally to haemorrhage.

*Note.*—It was very unfortunate that this case and the previous one came in at the same time and that both were bleeding, so that one of them had to wait. By the time the first operation was finished this man had lost a lot more blood, and died in consequence.

CASE 26.—Arab; bullet. Admitted Feb. 18th, 1916, half an hour after injury. Entrance wound 1½ inches above navel, ½ inch in diameter; exit wound outer edge of right erector spinae, 2 inches above iliac crest. Condition apparently good, abdomen soft. Pulse normal rate and of good quality, but within half an hour, when ready for operation, the pulse had become very feeble and over 100 in rate and vomiting and restlessness had set in, evidently due to severe internal haemorrhage. No operation. Patient died in the next half hour.

CASE 27.—Rifleman, Gurkhas; bullet. Admitted Feb. 20th, 1916, one hour after injury. Entrance wound small, over tip of left trochanter; exit 2 inches above and behind right trochanter, large, and tissues lacerated to considerable extent. Condition bad, much shock; severe pain in abdomen, generalised; no rigidity, but tenderness on pressure over hypogastrium. No operation. Death four hours later. No note of vomiting.

CASE 28.—Sepoy, Rifles; bullet. Admitted Jan. 29th, 1916, about 14 hours after injury. Entrance wound right buttock ½ inch from middle line at level of second piece of coccyx. No exit, but bullet could be felt beneath skin of abdomen 2 inches above pubes and to left of middle line. Condition fair; abdomen somewhat rigid and painful above pubes. Some dullness above pubes, ? bladder. Pain severe; lies on left side. Some bleeding from entrance wound. A catheter introduced before admission brought off bloody urine. No vomiting. Operation two hours later; median incision. Much bloody urine in peritoneal cavity, slightly faecal-smelling. There was one hole at the apex of the bladder admitting tip of index finger and another in the base; from this the track led into the rectum. At this stage of the operation the patient stopped breathing, and despite all the measures we could take died on the table. This was most unfortunate as the prognosis seemed favourable.

CASE 29.—Sepoy, Rajputs; bullet. Admitted Feb. 11th, 1916, about 2 hours after injury; wounded in arm and abdomen. Had lost a lot of blood from the wounds in the arm. Entrance wound in abdomen in left flank just below costal margin in mid-axillary line. Exit, right side, 1½ inches external to margin of right erector spinae midway between ribs and ilium. Condition poor, pulse weak; much pain on left side, no vomiting. Urine passed at 6.30 (wounded at 4) contained no blood. Abdomen stiff, especially on left side. No paralysis; said he was bending at time of hurt. Operation, 7.45 P.M.: Incision parallel to and 1½ inches below left costal margin; internal rectus split. There were some faecal contents in peritoneal cavity; one hole, ½ inch wide, in outer wall of descending colon. Result: Next day abdomen softer but pulse still bad. Died following day. Did not get nourishment ordered during night. His death was disappointing, but was largely due to the initial haemorrhage.

CASE 30.—Sepoy, Sappers and Miners; bullet. Admitted Feb. 12th, 1916, 5½ hours after injury. Entrance wound 2 inches below right iliac crest just behind tensor fasciae femoris, small. Exit just to left of and below umbilicus, 1 inch in diameter and bloody fluid exuding from it. Condition, much shock, pulse feeble. Great pain in abdomen, moderate rigidity. Advisability of operation very doubtful. Operation 1½ hours later. Peritoneal cavity full of intestinal contents, including recent food, grains of barley, &c. There were many large holes, eight or nine, some of which were complete rents of the small intestine, and none so small as to suggest that they could be closed by natural means. There was a good deal of blood in the pelvis, but no ruptured mesenteric vessel. All were sewn up. Pulse at the end of operation seemed no worse. Result: Did not rally and died next day.

CASE 31.—Havildar, Rifles; bomb from aeroplane. Admitted Feb. 13th, 1916, half an hour after injury. One wound, small, 2½ inches to right and below umbilicus; signs of haemorrhage; pulse feeble and quick. Operated at once in the hope of stopping the bleeding. There was a large amount of blood and clots in the peritoneal cavity, and much faeces and a large rent in the cæcum. The man died half an hour after operation from haemorrhage and shock.

CASE 32.—Sepoy, Pioneers; bullet. Admitted Feb. 14th, 1916. Wounded right flank. Operation within four hours. There was one small hole in the ascending colon near hepatic flexure with much bruising. Patient died on the third day. The notes on this case are, unfortunately, meagre.

CASE 33.—Sowar, Cavalry; bullet at long range. Admitted Jan. 21st, 1916, an hour after injury. Entrance wound over left hypochondrium, small; no exit. Condition bad; complained greatly of cold and was very restless. Abdomen moved freely on respiration, but was somewhat distended. No dullness in either flank. Pulse imperceptible at wrist. Died half an hour later.

CASE 34.—Water-carrier; bullet. Admitted Feb. 20th, 1916, 18 hours after injury. Entrance wound 4 inches behind and below right anterior superior iliac spine; exit, right chest, 2 inches below and external to nipple; probably pierced ascending colon and liver. Condition bad, facies anxious; had been vomiting. Abdomen painful over right half and over left hypochondrium, tender and very rigid. Pulse 95. No operation. Died next day from shock and peritonitis.

CASE 35.—Lance-Naick, Mule Corps; bullet. Admitted Feb. 20th, 1916, half an hour after injury. Entrance wound near middle line over fourth piece of sacrum. No exit, but evidence of bullet in abdominal wall 3 inches to right of umbilicus. Condition: Had been vomiting. Severe pain and lies on right side. Abdomen tender, but only moderately stiff. Pulse normal in rate and of very fair quality. Operation an hour later. Good deal of dark blood and clots in peritoneal cavity. There were nine holes in the small intestine and one in the upper part of the rectum. In two places the damage to the small intestine was so extensive that resection of 6 and 8 inches respectively was necessary; the others were stitched up by Lambert sutures. Patient took anaesthetic badly and died at end of the operation.

CASE 36.—Driver, Mule Corps; bullet. Admitted Feb. 22nd, 1916, within half an hour of injury. Entrance wound 4 inches behind right anterior superior iliac spine, small and round; exit 2 inches to right and a little below umbilicus, also small. Condition fairly good. Had vomited two or three times. Pain not severe, abdomen not rigid, but tender in right lower quadrant. Pulse slow and of fair volume. Operation half an hour later; incision medial to outer edge of rectus. There were a few ounces of blood in the peritoneal cavity and a little intestinal contents. Five holes in the small intestine, one of which was 1½ inches long, the others round and two of them small enough for purse-string suture. No special vessel was bleeding. Most of the blood appeared to have come from the wounds in the parietal peritoneum. Result: Recovery. Next day there was some distension and tenderness and the pulse was

feeble, but on the third day he passed a motion and the distension disappeared. The pulse improved and convalescence was uninterrupted.

CASE 37.—Arab coolie; bullet. Admitted Feb. 25th, 1916, two hours after injury. Entrance wound 4 inches below right nipple, no exit but a large round soft swelling 4 inches in diameter over ninth rib in mid-axillary line, left side; liver, stomach, and probably spleen involved. Condition poor; man aged 58, facies anxious, some bleeding from entrance wound, vomiting small quantities of mucus, &c. Very cold. Much pain in epigastrium. Upper abdomen rigid, but not very tender; lower abdomen soft. Pulse 85, small, soft, compressible. No operation. Died 3½ hours later.

CASE 38.—Lance-Naick, Mule Corps; bullet. Admitted Feb. 27th, 1916, three-quarters of an hour after injury. Entrance wound 3 inches to right of umbilicus; exit 3 inches below and behind left anterior superior iliac spine. Condition, 15 minutes after arrival, bad; considerable pain and good deal of tenderness, especially near entrance wound, but only slight rigidity. Pulse 90 and much worse than 10 minutes ago, evidently bleeding; 10 minutes later, 110 and weaker. Patient getting restless and cold, and vomited twice. No operation. Died an hour later.

CASE 39.—Private, Infantry; bullet. Arrived at dressing station only and died in 15 minutes. Wounded in lower abdomen from flank to flank. Death from haemorrhage.

CASE 40.—Gunner, R.F.A.; bullet. Admitted March 1st, 1916, about 1½ hours after injury. Entrance wound 3 inches to right of twelfth dorsal spine; exit just over surface-marking of pylorus. Condition not good; considerable shock; had vomited. Great pain; abdomen absolutely rigid and very tender. Pulse slow and somewhat irregular; volume moderate; probably some bleeding; 1 gr. morphia given. Operation 1½ hours later. There was a large longitudinal rent in pyloric end of stomach, 1½ inches long, and a similar one over pylorus itself. Much exudation of stomach contents and considerable amount of blood, most of which came from the liver, which had a small rent in it between the two lobes. Result: Vomited several times during the night. Next day abdomen still stiff and tender. Much bile on dressings. Pulse faster and weaker. Did not rally from shock and died same day.

CASE 41.—Sepoy; bullet. Admitted 3.30 P.M. on March 1st, 1916, 2½ hours after injury. Entrance wound right flank about middle of iliac crest; exit through left chest 1 inch external to nipple line at level of sixth rib. Omentum protruding through exit wound. Condition: Great pain and tenderness, but not much rigidity; had vomited. Pulse 95 and of poor volume, suggesting haemorrhage. Operation within half an hour. Abdomen was absolutely full of faeces and blood, some of it from the liver. Very extensive damage to the transverse colon. Patient's condition did not admit of any complete operation, so the cavity was quickly cleaned and a hasty colotomy done, but he died in an hour, mostly from haemorrhage.

CASE 42.—Private, Infantry; bullet. Admitted March 3rd, 1916, half an hour after injury. Entrance wound 2 inches above left trochanter. No exit. Man was in the act of defaecating when hit. Condition: Lay on right side, severe pain; very rigid, much vomiting; pulse slow and good. Operation half an hour later. There were 11 holes in the intestine, 3 in the large and 6 in the small, and 1 on each side in the pelvic walls, low down, below the internal iliacs, from which was considerable bleeding; no bleeding point found. Blood in cavity ½ to ¾ pint. Result: Remained in great pain and did not rally; died next day.

CASE 43.—Lance-Naick, R.F.A.; bullet. Admitted March 6th, 1916, half an hour after injury. Entrance wound 2 inches internal to right anterior superior iliac spine; exit left buttock 4½ inches below and behind left anterior superior iliac spine. Right forearm also wounded. Condition: Great pain, abdomen rigid, considerable bleeding. Pulse about 80 and of moderate volume. Not specially distressed. Operation half an hour later; rectus incision. Abdomen full of blood, mostly venous, the bleeding coming from wounds in gut and from four rents in mesentery, especially two of the latter. Five holes in small gut of varying sizes from ½ to 1½ inches, 4 in mesentery. Result: Died 4 hours later, chiefly due to haemorrhage.

CASE 44.—Sepoy, Punjabis; bullet. Admitted fifth day after injury. No operation. Died sixth day; peritonitis.

CASE 45.—Lance-Naick, Gurkhas; large bullet. Admitted March 11th, 1916, about an hour after injury. Entrance wound left flank; large, round. Complained of great pain; abdomen slightly tense; pulse very good and slow. No note of vomiting. Operation an hour later. There was a lot of arterial blood in the peritoneal cavity, mostly coming from an artery in the pelvic mesocolon; four holes in small intestine, four in mesentery, and two in rectum. Result: Did well at first; there was no distension. He passed faeces and

urine naturally, and condition generally on the third day seemed very favourable, but on the fourth day there was distension, which was relieved a day later by small doses of mag. sulph. and turpentine stupes. On the 15th he started diarrhoea, which persisted for some days, and the discharge became somewhat offensive; the lower abdomen ceased to move with respiration and became tender and painful. He steadily went downhill unfortunately, and died rather suddenly on March 22nd. Possibly some of my stitches broke down, but I did not feel justified in opening him up again.

CASE 46.—Arab girl, aged 14; bullet. Admitted March 14th, 1916, 1½ hours after injury. Entrance under right flank, just above costal margin, 1 inch behind the mid-axillary line; exit 2 inches below xiphisternum. Small tag of omentum protruding from anterior wound. General condition not good; pain and shock, slight rigidity. Pulse slow and fairly good. Operation half hour later. One hole in hepatic flexure; a large hole and rent 4 inches long in right lobe of liver, 1½ inches from lower margin. Anterior portion of right lobe button-holed; gall-bladder bruised. Result: Did well at first, but developed pyo-pneumothorax and died on April 7th from septic exhaustion. There was no trouble with the intestinal condition; the abdomen remained soft and painless and the bowels normal.

CASE 47.—Private, servant; bullet, .400 uncased. Admitted March 15th, 1916, within half an hour of injury. Entrance wound 2 inches below and 1 inch behind left anterior superior iliac spine; no exit. Condition: Great pain, especially around navel, and tenderness. Burning sensation extending from left iliac region to navel. Abdomen slightly tense; vomited once. Pulse slow and of fair quality. Operation half an hour later. Took anaesthetic badly. There were 2 holes in the pelvic colon; 2 semi-holes in the cæcum, near which lay the bullet; 3 holes in the small intestine, one 1½ inches the others ½ inch in diameter; 2 large holes in the mesentery, one of which was bleeding. Result: Did not rally from shock and died 20 hours later.

CASE 48.—Sepoy, Infantry; bullet. Admitted March 17th, 1916, 10 hours after injury. Entrance wound 4 inches behind right anterior superior iliac spine; exit 2½ inches medial to it. Condition: Old man with pyorrhœa alveolaris. Great pain; abdomen very rigid; pulse about 90, poor. Had drunk 2 ounces of milk, given him by an orderly. Operation 3 hours later; bleeding moderate. Good deal of extravasation of intestinal contents, mostly grass. Seven holes in small intestine, in size from a pea to half-a-crown; a small portion had to be resected. Pulse at end very bad. All possible shock measures taken. Result: Improved during first few hours, but died on following day.

CASE 49.—Sepoy, Infantry; bullet. Admitted March 19th, 1916, about 15 hours after injury. Sent in as gunshot wound of the thigh. Entrance wound to right of fourth vertebral spine; exit 1½ inches above middle of right Poupart's ligament. Condition: Pale, anxious, and tired-looking. Abdomen distended and tense; considerable pain and tenderness. Pulse slow and good. Operation an hour later; paracentral incision. Considerable amount of blood diffused in peritoneal cavity. Small intestine blown up. Two holes in cæcum: one ½ inch, one ¼ inch; local peritonitis. Result: Recovery. Distension persisted for a couple of days, but began to disappear after a simple enema in the evening of the second day.

CASES 50, 51, 52.—Private, sergeant, and private. All wounded by bomb which fell in hospital. In No. 51, who was operated on first, there was prolapse of several feet of small intestine and the cæcum, a 3-inch hole in the parietes, and another of 1½ inches. There were three holes in the small intestine, and the cæcum was badly torn and bruised. The small holes were stitched up and a colostomy done. In No. 50 there were four holes in the small intestine and a piece of bomb was removed from the gut. No. 52 bled a lot before he could be attended to, and had sustained damage to the cæcum and the small intestine. All died within the next two days.

CASE 53.—Arab; bullet. Admitted March 23rd, 1916, within an hour of injury. Entrance wound 1½ inches above left trochanter; no exit. Condition: Poor, aged 55, pyorrhœa alveolaris; pulse slow but poor volume and tension; bleeding probable. Good deal of shock. Operation 1½ hours after injury. Large quantity of arterial blood in peritoneal cavity, also a large round worm and other intestinal contents. One large rent and one smaller hole in small intestine. Entrance and exit wounds in recto-vesical pouch, from which some bleeding. Result: Died next day, mostly due to haemorrhage.

CASE 54.—Sepoy; bullet. Admitted March 23rd, 1916, at 10 P.M., soon after injury. Entrance wound 2½ inches above posterior superior iliac spine. No exit, but bullet lying under skin near McBurney's spot. Condition good. No vomiting. Operation, 11 P.M.; diagonal incision. One small hole in cæcum stitched up; bullet removed. Result: Uninterrupted recovery.

CASE 55.—Sepoy, Infantry; bullet. Admitted 2½ hours after injury. Entrance wound 2 inches above and behind left anterior superior iliac spine. Exit 4 inches behind and 2 inches below right anterior superior iliac spine. Condition poor. Pulse 70, poor. Abdomen painful, rigid, and tender; considerable shock. Decided not to operate unless improvement set in. An hour later pulse 90 and worse. No operation. Died in 6 hours.

CASE 56.—Sowar; bullet. Admitted three or four days after injury. Abdomen swollen and distended. Laparotomy undertaken for drainage. There was a hole in the transverse colon and the omentum was gangrenous. Pus in abdominal wall and in peritoneal cavity. Death three days later.

CASE 57.—Private, Infantry; bullet, .400 uncased. Admitted half an hour after injury. Entrance wound 1 inch to right and below umbilicus; no exit. Condition: Very restless and shocked, pale, anaemic. Pulse small, soft, slow. Abdomen very painful and somewhat rigid; had vomiting severely. No operation. Died next morning; haemorrhage and shock.

CASE 58.—Naick; bullet. Admitted March 28th, 1916, 2½ hours after injury. Entrance wound 2 inches above and medial to left anterior superior iliac spine; exit 5 inches below and behind right anterior superior iliac spine. Great pain, some rigidity and tenderness, no vomiting. Not blanched. Pulse 70; not too good. Operation an hour later. Loss of blood not excessive. Ten holes in small intestine; one in large, descending colon. The ten former were stitched up, the latter left as colotomy owing to condition of patient. Result: Pulse very variable during operation; very restless afterwards. Died third day from shock.

CASE 59.—Lance-Naick; bullet. Admitted March 29th, 1916. Entrance wound near twelfth dorsal spine; no exit. Great pain in epigastrium and tenderness. Slight rigidity in upper abdomen; no vomiting. Pulse very poor, 80, small, low tension. Died same night, probably haemorrhage.

CASE 60.—Arab girl, aged about 8; bullet. Seen in her home about 2 hours after injury, when there were no abdominal symptoms and viscera were thought to have escaped. Entrance wound 1½ inches above pubes 1 inch to left of middle line; exit right hip 2 inches behind anterior superior iliac spine; ? injury to bladder. Next morning, 17 hours after injury, symptoms of peritonitis; temperature 103° F. Operation: Two small holes in bladder, one in small intestine around which peritonitis. Patient died suddenly four hours later. This case should have been saved; thorough exploration of the wound would probably have revealed the condition and have been followed by operation.

CASE 61.—Private, Infantry; bullet. Admitted March 30th, 1916, 45 minutes after injury. Entrance wound 2 inches behind left anterior superior iliac spine; no exit. Had had morphia. Sitting down when hit. Condition: Semi-blanching and sweating. Comfortable, little or no pain. Abdomen fairly soft, no tenderness. Pulse imperceptible at wrist. Died same afternoon.

CASE 62.—Sepoy, Rajputs; bullet, April 1st, 1916. Seen within few minutes. Lower abdomen; prolapse of omentum; vomited, no rigidity, bleeding pulse. Died in half an hour.

CASE 63.—Similar case, lower abdomen. Died in 15 minutes, probably haemorrhage.

CASE 64.—Sepoy, Punjabis; bullet. Admitted April 11th, 1916, half an hour later. Entrance wound 1 inch to outer side of left posterior superior iliac spine; no exit. Was standing up when hit. Condition, shocked; great pain in stomach; had been given opium. Hands cold. Abdomen tense and tender all over. Pulse 75, regular, fair volume, low tension. Considered not bleeding seriously, and decided to await recovery from shock. Seven hours later pulse better; tenderness referred especially to right side abdomen. Operation an hour later—i.e., 8½ hours after injury. Haematoma in right abdominal wall. Considerable amount of blood in peritoneal cavity. Good deal of peritonitis on several coils of intestine; .400 uncased bullet found lying in peritoneal cavity. Six holes in small intestine, four of them large; one in mesentery. Stood operation well, but pulse irregular at times. Result: Recovery. Some slight distension first two days, and ran temperature from fourth to seventh day; some cough for few days.

CASE 65.—Sepoy, Sappers; .303 bullet, self-inflicted. Admitted half an hour afterwards, on April 13th, 1916. Entrance wound ½ inch to left and above umbilicus, omentum protruding and venous blood exuding on movement; exit 2½ inches left of middle line at back, same level. Both wounds small and round. Patient very pale, cold, restless, and pulseless. Abdomen soft, not tender. Died in half an hour; haemorrhage.

CASE 66.—Sweeper, Infantry; bullet. Admitted April 16th, 1916, half an hour after injury. Entrance wound 2 inches above left costal margin, just outside nipple line; exit 2 inches below right costal margin 1½ inches outside nipple.

Left rib broken; arm wounded. Condition fair, no vomiting. Abdomen semi-rigid and very tender. Pulse 80, ? increasing in rate, fair quality, some sweating. Operation half an hour later; moderate amount of blood; some bile and good deal of stomach contents. Three holes in stomach, ½ to 1 inch long, two in gall-bladder. Gastro-hepatic omentum torn, whence some bleeding. Small rent in liver, of which bleeding stopped. Both sacs drained. Result: Died third day.

CASE 67.—Lance-Naick, Punjabis; bullet. Hit midnight April 18th, 1916. Wounds side to side near iliac crests. Brought into regimental hospital in early morning with distended abdomen, greatly diminished liver dullness. Thin pulse, 45; body cold. At the general hospital at 10 o'clock. No pulse at wrist, carotid 120; dull in both flanks. Breathing laboured. Abdomen rigid and tender. Died at 2 P.M.

CASE 68.—Arab; bullet. Admitted April 18th, 1916, 21 hours after injury. Entrance wound left of spine; exit left flank. Abdomen tympanic and tender in lower part. Pulse small, weak and 140. Frequent vomiting. Taken to his home and died next day.

CASE 69.—Driver; bullet. Admitted April 20th, 1916, 5½ hours after injury. Entrance wound over McBurney's spot; exit tip of left great trochanter. Facies anxious and drawn, anaemic; much vomiting. Abdomen tense and tender. Pulse 105, small, low tension and volume. No operation. Died next day.

CASE 70.—Sepoy; bullet. Admitted April 24th, 1916, 3½ hours after injury. Entrance wound over McBurney's spot; exit middle left gluteus maximus, both very small. Condition: Great pain, facies very anxious, abdomen tense and very tender; pulse 85, fair volume, but very low tension vomited later. Operation not advised. Died third day; peritonitis and haemorrhage.

CASE 72.—Private; bullet. Admitted April 26th, 1916, 2 hours after injury. Entrance wound to left of posterior superior iliac spine; exit 2 inches below umbilicus, bleeding. Great pain, facies anxious, vomiting. Abdomen slightly tense and tender. Pulse 88 and increasing in rate; restless. Died few hours later.

CASE 74.—Lance-Naick, Punjabis; bullet. Admitted April 25th, 1916, 1½ hours after injury. Entrance wound small, tip of left trochanter; exit 1 inch above pubes, 1 inch to right of middle line. Condition: Facies slightly anxious, much pain; vomited twice. Abdomen somewhat rigid, tender, and slightly tympanic. Pulse 70, full, very fair quality. Operation half an hour later; oblique incision, muscle splitting, good deal of clot and blood in pelvis, and some intestinal contents. Two small holes in small intestine and two in parietal peritoneum over top of bladder. Result: Uninterrupted recovery.

Other lower abdomen cases in Kut were two communicated by Captain M. L. Puri, I.M.S., which both died without operation, one from bleeding and the other from peritonitis; one by Captain W. C. Spackman, I.M.S., in which a small bullet passed through from loin to scrotum. There was great pain, intense desire to micturate, and thirst; the pulse, at first good, rapidly increased in rate, and death occurred in 2½ hours.

There were six cases under the late Major F. C. Lambert, R.A.M.C., in the British Hospital before he so unfortunately contracted his fatal illness. One was operated on and all died; the operated one bled a lot from the splenic vessels. Captain King described three cases. One was a lower abdomen and died with a faecal fistula in eight days; the second was wounded in the epigastrium and died in 24 hours, mostly from haemorrhage; he vomited. The third was a bomb wound over the liver, with no involvement, as far as could be made out, of the intestine; he recovered. None was operated on.

#### *Cases of Wounds above the Transpyloric Plane.*

CASE 86.—Arab, Jan. 1st, 1916. Entrance wound 2 inches below xiphisternum; exit 3 inches above right costal margin. Apparently liver only. No operation; was walking about on third day.

CASE 87.—Arab boy, Feb. 15th, 1916. Entrance wound 2 inches above right costal margin, anterior axillary line; no exit. Pain right side; semi-rigid abdomen. Operation: 3-inch rent in liver, sewn up by thick catgut sutures; good deal of blood in peritoneal cavity, but bleeding was stopping. Recovery. Some trouble with wound in pleura for some time.

CASE 88.—Sepoy. This occurred in India some years ago. The man was hit at a few yards distance on the rifle-range. The bullet entered just about over the surface marking of the pylorus, and the exit was at a corresponding position at the back. There were no untoward symptoms at all, and the man was well in a few days.

*Conclusions.*

1. The mortality in penetrating wounds of the abdomen below the transpyloric plane is very high, about 97 per cent.
2. Slight symptoms or small wounds do not justify conclusion that internal lesion may be slight or harmless. On the contrary, it should be assumed that a penetrating wound means serious damage and probably fatal damage.
3. Laparotomy should be the routine treatment for these cases, provided the condition of the patient is good enough for a major operation.
4. Haemorrhage is the most serious complication of these wounds.
5. Operation should be done at once if serious bleeding be taking place. The pulse is the best guide to this, and needs watching most carefully.
6. It is not worth while, as a rule, to operate if over 12 hours have elapsed since the infliction of the wound.
7. Wounds above the transpyloric plane may sometimes be treated expectantly, especially those apparently involving the liver only.

## THE PHENOMENA OF ANAPHYLAXIS.

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THE extended use at the present time of prophylactic and therapeutic injections of antisera brings into especial prominence the condition of anaphylaxis. The liability to the establishment of this condition calls for care in the administration of the sera and for some idea of the mechanism of the reaction in order that rational steps may be taken to minimise or remove the danger that may be apprehended. That anaphylaxis may ensue on suitable treatment with bacterial vaccines has been recognised since the work of Rosenau and Anderson in 1907, but is clinically of little importance on account of the minute quantities of bacterial protein used for vaccination purposes—amounts insufficient to make a toxigenic dose. In the case of diphtheria antitoxin the matter is quite otherwise and is of considerable moment, since there have been many cases reported of severe illness after injection of this serum. A few cases even of death have also been recorded. The question is now especially acute in relation to tetanus, that most terrible disease towards the eradication of which very energetic efforts are at present being directed. And the question arises because a single prophylactic dose of tetanus antitoxin is being given to every man wounded in battle. When, therefore, it is later deemed desirable to give further prophylactic doses of, symptoms of tetanus being manifest, larger therapeutic doses, the medical officer must decide as to the possibility of anaphylaxis following and either trust to luck that no ill-effects are produced or take anti-anaphylactic measures.

The present state of our knowledge—or should it rather be ignorance?—does not allow of any real and satisfactory definition of anaphylaxis. It seems more than possible that the phenomena now included under that head are in reality manifestations of two or more processes. The condition may be provisionally described as one of greatly increased sensitiveness of the animal organism to the introduction of foreign protein, so that injections of the latter in amounts which are innocuous to controls produce in the hypersensitive animals symptoms of varying intensity and even acute death. Such a state of hypersusceptibility may be idiopathic to the individual in a few rare cases, while in others sensitisation may be accidentally effected in ways which are only now coming under suspicion. In addition, many of the clinical symptoms of human disease have been attributed to anaphylaxis, but the term is usually employed to denote the acute shock seen in animal experiments, the serum disease of man, and some diagnostic reactions such as those with tuberculin, mallein, &c., and can at present be applied with any degree of certainty to these conditions alone.

*The Phenomena of Anaphylaxis.*

The Theobald Smith phenomenon is the point from which started the real investigation of this condition. He noticed that guinea-pigs treated with neutral mixtures of diphtheria toxin and antitoxin became subsequently hypersensitive to injections of normal horse-serum, and it was soon shown that the sensitisation was due not to the toxin or antitoxin

but entirely to the normal protein constituents of the serum. From this it was but a short step to demonstrate that anaphylaxis may be effected by any protein substance—e.g., egg-albumen, milk, bacteria, &c. In conformity with the general terminology of immunity, these substances are called antigens. It has further been shown that all antigens are protein in nature, and it is almost conclusively proved that no body other than protein is capable of acting as an antigen.

Turning first to the purely experimental side of the question, it will be well to consider the method by which sensitisation of animals is effected and the results of second injection into such sensitised animals. The first experiments in this direction were those of Flexner, Richet, and one or two others, who showed that rabbits and dogs injected with a foreign serum died after a second injection of a sub-lethal dose of the same serum. The first dose is called the sensitising and the second the toxigenic. These workers used a substance toxic in itself, but even so, it was found that the toxigenic dose caused death in such small amount as failed to do so in untreated animals. It remained for later observers to show that precisely the same effect ensues upon the use of proteins in themselves quite harmless. It has been further found that animals of different species vary greatly in the ease with which they are sensitised—e.g., guinea-pig, horse, and goat fall an easy prey to the condition, rabbits and dogs are less susceptible, and mice almost or completely refractory.

The amount of protein required for a first dose varies within very wide limits, sensitisation having been effected by extremely minute quantities, even as small as 0.000.001 c.c., and there is apparently no limit in the other direction so long as it be not in itself incompatible with the life of the animal. The second or toxigenic dose may likewise vary indefinitely upwards, but the minimal dose is at least 100 to 1000 times larger than that for sensitisation, and is for guinea-pigs some 4 to 5 c.c. These figures refer to such antigens as possess no inherent toxic properties; where the antigen is itself a poison much smaller amounts may be used for the second injection.

The hypersensitive state does not supervene immediately upon the sensitising injection—a certain definite interval must elapse before the animal becomes anaphylactic. In the earlier days of the investigation it was generally thought that this interval varied with the size of the sensitising dose, that the smaller the amount of antigen used the shorter the period required for the full development of the condition and as the amount of the antigen was increased so the period lengthened. More recently, however, it has been shown that no such definite relationship exists and the average time after a moderate-sized first dose is from 12 to 14 days, although after a massive first dose sensitisation may be more or less delayed.

The route by which the foreign protein is introduced into the animal is a matter of some importance. As regards the sensitising dose the usual route is intravenous or subcutaneous injection, but any method will succeed that ensures the penetration of the antigen to the physiological interior of the body. The possibility of effecting this by the alimentary canal seems now fairly certain since it has been shown that protein fed to animals in large quantities is later demonstrable unchanged in the blood. Generally, however, gastric and pancreatic digestion will so alter the constitution of such substances that no sensitisation is possible except in abnormal circumstances where the processes of digestion are interfered with, when it appears that unaltered protein may pass into the large gut, be there absorbed to some extent, and so sensitise the animal. In the case of the toxigenic dose greater variability prevails, and antigen administered by the mouth or per rectum never produces anaphylactic shock,<sup>1</sup> for which purpose parenteral injection must be employed. The most certain methods are intracerebral and intravenous injections, next intramuscular, then intraperitoneal, intrapleural and subcutaneous, and finally intrathecal.<sup>2</sup> The intracerebral route is peculiar in that it

<sup>1</sup> This statement needs modification in view of the fact that the disease produced in some persons by the ingestion of strawberries, eggs, &c., has been attributed to anaphylaxis.

<sup>2</sup> Although this has been often maintained it seems sufficiently doubtful to warrant all care in using this route in human therapy. Huitrel has reported four deaths from anaphylaxis consequent upon intrathecal injection of antimentingococcus serum, and Bewerka and Lisowsky have produced the same effects with normal horse-serum in guinea-pigs. They have thus shown that these animals may be either sensitised or intoxicated by the intrathecal route.

appears less suitable for sensitisation than the other routes; but if the toxigenic dose be given in this way, the shock appears sooner and in greater intensity than in other circumstances.

The anaphylactic reaction resembles all other immunity reactions in its specificity—i.e., specificity is not absolute. An animal sensitised to one particular antigen, in addition to reacting with a second dose of the same substance, may also react to another but closely allied protein but with a quantitative difference—to obtain the same intensity of reaction a much larger quantity of the heterologous substance than of the homologous must be administered. In short, there is much evidence in favour of the view that the toxin responsible for this reaction is in no way specific, but that all antigens give rise to the same poison. The specificity observed is due only and entirely to the specific antigen-antibody complex occurring in each case (*vide infra*). Pointing to the same conclusion is the fact that a non-specific anti-anaphylaxis (refractory period) may be produced by injection of a hypersensitive animal with peptone. It has also been shown that the same animal may be at one and the same time sensitised to a number of different antigens.

The manifestations of anaphylactic shock vary with the species of the animal experimented upon. The essential features are as follows. The onset is sudden and immediate (within a few minutes). The guinea-pig becomes obviously uneasy, with restlessness and sneezing, while the respiratory rhythm increases in rate. This may be followed by discharge of urine and faeces, and the appearance of marked muscular weakness. Later respiration becomes irregular and laboured, inspiration is obviously extremely difficult, and the chest remains permanently expanded, never contracting fully. Death may ensue in a convulsion or by coma, in which the breathing gradually becomes slower and more shallow, until finally it ceases altogether. The condition is evidently due to interference with the respiratory functions. In rabbits symptoms appear after a short interval of a few minutes or more, the animal first showing marked muscular weakness with discharge of urine and faeces. The weakness increases until no voluntary muscular effort is possible but convulsions may occur. Death is due to asthenia. Anaphylactic shock is manifested in dogs first by restlessness, vomiting, and the passage of urine and faeces. General weakness rapidly ensues followed by twitching and laboured and irregular breathing. There is rapid and extreme fall in the blood pressure, and cerebral anaemia causes death. Generalised tremor, great weakness, laboured respiration, and incontinence of urine and faeces are the symptoms of anaphylaxis in horses and goats.

The symptomatology, &c., of human anaphylaxis is discussed in a later paragraph.

The pathology of this condition has been thoroughly worked out by numerous investigators, especially Auer and Lewis, and Pearce and Eisenbrey. It appears due to a toxic substance in the elaboration of which the liver plays some part and its action is probably not central, i.e., upon the central nervous system, but peripheral, upon the nerve endings or the muscles themselves. In guinea-pigs the predominant change is an extreme contraction of the muscles of the bronchioles so that no air can enter the pulmonary alveoli, in consequence of which and the extreme thoracic expansion the lungs are, after death, found blown out and inelastic, with the alveoli distended and many of the septa torn. There are, in addition, more or less numerous visceral hemorrhages. Section of both vagus nerves does not alter these findings, showing that the action is not within the brain or medulla. In dogs the effects are practically limited to the vascular system, and it has been shown that the action is upon the vaso-motor nerve endings, since if these have been previously paralysed no further fall of blood pressure occurs during anaphylactic shock, while a fall produced by anaphylaxis is diminished by the exhibition of drugs which stimulate the muscularis of the blood-vessels.

Little can be said as to the nature of the toxin responsible, since but little is known concerning it. The striking analogy between the manifestations of peptone poisoning and those of anaphylaxis have been pointed out by many, and some have maintained that the latter is due to the action of a peptone. This is not impossible in view of the results obtained by Vaughan and Wheeler with the products of proteolysis—protein split-products; but no real deductions can be made from the phenomena of peptone poisoning in

this connexion owing to the fact that the only samples of peptone available are composite mixtures of many substances, and their composition varies within very wide limits. Rosenau and Anderson came to the conclusion that none of the known antibodies (precipitins, &c.) is responsible for anaphylaxis, but later observations by Doerr and Russ point to the fact that precipitins are in reality a prime factor in the production of the condition.

It is of interest to note that the above method is not the only one by which anaphylaxis can be produced; it is the condition of active anaphylaxis, but the passive installation of the state is also possible. By infusion of a normal animal with the serum of one sensitised the former is rendered sensitive, while it has also been shown that the young of a hypersensitive mother are in the same condition, and that whether the maternal sensitisation be effected before conception or during pregnancy. In such circumstances it does not usually persist for any prolonged period. Transference takes place by means of the placental circulation and not by the milk. Further, Schenk has described inheritance of this condition by the young of normal females impregnated by sensitised males, but this needs confirmation before it can be accepted as fact.

The duration of the anaphylactic period—i.e., the length of time after a sensitising injection during which the animal remains liable to the shock on a second injection—is still in some doubt. Its time of onset, as stated above, is usually 12 to 14 days, and animals have still been found sensitive after as much as three years. It is, therefore, no transitory state and persists for very considerable periods, but whether the intensity of the sensitisation diminishes with age, whether with time it may disappear altogether, and, if so, when such decrease commences and when it is complete, have not yet been worked out. It is thus obviously necessary in dealing with man always to assume the possibility of anaphylaxis resulting if the individual has at any time previously received a dose of antigen capable of rendering him sensitive.

Closely allied to, if not identical with, the phenomena described above is the serum disease of man, which may assume either of three forms. The first to be described was that occurring after a single large dose of serum, and symptoms appear 8 to 12 days after the injection. They are numerous and varied, the commonest being urticaria, often involving a large part of the surface area, sometimes practically all. Other rashes—morbilloform or erythematous—are sometimes, but more rarely, seen. At the same time joint pains are common, and there may be swelling and tenderness of the lymphatic glands associated with the site of injection. Some pyrexia and occasionally slight albuminuria may be associated. The symptoms pass off in from 12 to 48 hours. The second form is the *accelerated* reaction so called because it appears earlier than the above—viz., 4 to 8 days after the second injection. It does not occur after a first injection. The symptoms are similar to those just described, but are more acute, and generally pass off within 12 to 18 hours. As a rule, neither of these forms is of serious import, but now and then may be very severe or even fatal.

The third form—the *immediate* reaction—is the same as that seen in experimental animals. Symptoms supervene within a very short time of the second injection. At present, however, the whole subject of serum disease is in a very unsatisfactory state, and a large amount of work remains to be done upon the subject. Little or nothing is yet known concerning the effect of differences in the size of the first dose or of the second, or of changes in the ratio one to the other. Further, it appears necessary to distinguish between the local effect of the injected antigen and its systemic—anaphylactic—effect. Nothing has yet been done in this direction. Finally, there is the question as to the liability to anaphylaxis after multiple injections, and if it does occur in such cases are the symptoms the same or in any way modified? I am at present engaged upon making observations with a view to throwing light upon these points.

As regards liability to anaphylaxis man appears to occupy an intermediate position in the range of animals, being less susceptible than guinea-pigs, probably less even than dogs and rabbits, but more so than mice. It is of interest, however, to note that the symptoms produced in man approximate closely to those seen in guinea-pigs, and the pathology is probably essentially the same in both cases.

The onset of symptoms is sudden and after but very short delay—generally within half an hour. First appear local pain and tenderness, and the site of injection becomes swollen, red, and hot. The swelling may be very marked, and where the upper arm is used may extend from shoulder to wrist. Irritation with an intense desire to scratch the part may be a prominent symptom. On the other hand, the systemic phenomena may be intense without any or all such local changes. Suppuration never occurs (except infection be effected by faulty technique), and the part becomes normal within 24 to 48 hours. Almost at once the patient complains of difficulty in breathing, the chest becomes expanded and almost rigid, inspiration is particularly impeded, the face may become swollen and congested, the mucous membranes cyanosed. Auscultation of the chest shows the normal vesicular breath sounds replaced by a high-pitched bronchovesicular murmur. Moist sounds are not heard. Extreme urticaria, as in the ordinary form of serum disease, is sometimes seen at the same time. In cases slightly less severe the patient will sit up labouring for breath and racked by a frequent, almost continuous or paroxysmal, dry cough. Relief comes as suddenly as the onset, and in 15 to 30 minutes the patient is to all appearances normal.

As to sensitisation of man it is still impossible to make any definite statements. After considerable doses very many times repeated the anaphylactic state may appear within four or five days, whereas after two or three small doses (4 to 5 c.c. per dose) it may still be absent 28 days after the last. A single injection of 3 to 5 c.c. does not sensitise, and persons receiving massive injections are not, or at all events not always, hypersensitive after six weeks.

#### Theories of Anaphylaxis.

To explain the phenomena of anaphylaxis several theories have been from time to time propounded, but most of them have in one respect or another been found wanting. Adequately to deal with all such theories is impossible in the present circumstances, and, moreover, is not called for by the object in view. Without, however, entering minutely into details of experiments, it is perhaps well to outline the more important of the theories put forward and to indicate wherein they fail.

Gay and Southard, believing that every antigen consisted of two distinct portions, supposed that during the interval between the sensitising dose and the appearance of the hypersensitive state one of these portions—the toxic—was eliminated from the body, while the other—the sensitising—was retained. The latter, acting in some way not yet known upon the body cells, rendered them capable of assimilating the toxic moiety of the antigen, whereas before they were incapable of so doing. In consequence, when the toxigenic dose is administered to a sensitised animal, rapid assimilation of the toxic element by the body cells takes place with resulting anaphylactic shock. As will be seen later, anaphylaxis may occur without active participation of the cells but entirely in the blood, and, further, during the manifestation of the symptoms complement or alexin disappears from the blood, and it has been shown that the complement is an important element in the production of anaphylactic shock. These facts are obviously not accounted for by the theory of Gay and Southard.

A second theory dependent upon the assumption of the existence of two distinct elements in the antigen is that of Besredka. The one he terms "sensibilisinogen," which in the body gives rise to the formation of an antibody, *sensibilisant*. The second element he calls "anti-sensibilisin," which after the first injection is excreted from, or destroyed in, the animal, but after the second injection reacts with the *sensibilisin* with the production of a toxic substance responsible for the subsequent symptoms. This theory becomes untenable in view of the fact that it goes counter to all the known principles of immunity in that it supposes the production of a specific antibody which reacts *not* with its antigen but with another substance altogether.

The above theories received some support when it was found possible to separate by physical means (fractional precipitation, heat, &c.) sensitising and toxic portions from protein substances. These results, however, have not been confirmed, and other workers state that no such preparation is possible, and that the sensitising and toxic molecules are one and the same. On the other hand, Vaughan and Wheeler have effected such a separation by chemical means. But,

even so, the objections enumerated above remain unaffected. Bringing about proteolysis by alkaline alcohol, these two obtained from protein toxic and non-toxic split-products, and therefore supposed that a first injection of antigen leads to a slow lysis by which the non-toxic substance is liberated. This in turn gives rise to the production of an enzyme—a lysin—which, acting with greater rapidity and intensity upon the second injection, liberates comparatively large amounts of the toxic body. Anaphylactic shock results from the action of this latter. The theory is more complete than either of the preceding, since the assumption of a preliminary lysis allows for the part of the complement in the reaction. Friedberger's later theory supplements this and reconciles it more thoroughly with all the facts.

Richel suggests the theory that the first injection of antigen causes the production of a substance, *toxogenin*, and that after a second injection this reacts with the fresh antigen to produce the anaphylactic poison, *apotoxin*. As will be seen immediately, this is but a somewhat crude foreshadowing of Friedberger's second conception, and there is no need to postulate the appearance of a distinct and specific toxogenin since complement and antibody are capable of performing all the reactions attributed to it by Richet. Friedberger's anaphylatoxin too is but Richet's apotoxin under another name.

Bringing anaphylaxis into line with Ehrlich's theory of immunity, Friedberger formerly suggested that the condition was one step towards immunisation. According to Ehrlich, the presence in the body of a foreign protein calls forth the production of side-chains which unite with and neutralise the antigen. These side-chains are formed by and in the cells in excessive numbers which, in the ordinary course of events, are cast off into the general circulation. Friedberger postulates that in certain circumstances the side-chains or receptors remain sessile upon the cells. This appears the more likely if Adami's theory be accepted that the production of receptors is a function of the nucleus from which they pass into the cytoplasm before reaching the blood. It might easily be that for some reason they are held up in the intermediate position. Such a cell would obviously be in a hypersensitive state—the larger number of receptors would attach a greater amount of antigen with a correspondingly greater toxic effect. The same objections, however, are applicable to this theory as to those of Gay and Southard and Besredka—viz., that it does not go far enough and fails to account for all the facts. It is, moreover, doubtful in the light of more recent knowledge whether Ehrlich's theory be the correct explanation of immunity reactions; the weight of evidence appears against it.

Nicolle believes anaphylaxis to be due to the resultant of the action of two substances—an albuminolysin and an albuminocoagulin. Sensitisation causes production of the former out of all proportion to the latter, hence the antigen of the second dose undergoes rapid lysis with the formation of toxic substances. All recent work, however, points to the fact that albuminocoagulin—precipitin—so far from being protective is actually the prime cause of the condition.

Lastly, there remains Friedberger's later theory which, better than any other, reconciles all the known facts and probably approaches nearest to the truth. The blood of an animal showing symptoms of anaphylaxis possesses no, or very little, complement, but that the condition is not due merely to lack of complement is shown by the fact that no modification is effected by the injection of fresh guinea-pig's serum simultaneously with the second dose of antigen, indicating also that complement is fixed in this condition. What is the explanation? Friedberger found that complement is able to form from antigen a toxic body which, injected into a normal animal, gives rise to all the phenomena of anaphylactic shock. But while complement alone is capable of effecting this change to a slight extent, the toxic product appears with far greater rapidity and in far greater quantity if the specific antibody be also present, and this has been confirmed by several other workers, amongst them Thiele and Embleton, who believe that they have traced the direct development of the antibody from normal complement. The toxic substance produced in this manner has been called *anaphylatoxin*. The success of the experiment depends upon three factors—the quantities of complement and antibody, relative to one another and to the quantity of antigen; the time during which the substances are allowed to react; and the temperature at which they are kept. As

regards the first, there is a certain definite range within which (for a given amount of antigen) complement and antibody give rise to anaphylatoxin, but outside which—i.e., if either be in excess or deficient—the toxin does not appear. If the time allowed be insufficient the mixture remains innocuous; if the time be extended beyond a certain limit the mixture becomes innocuous. The disintegration of the antigen proceeds so far that the toxic substances are still further split up to simpler non-toxic compounds. Finally, the lower the temperature the slower the production of anaphylatoxin, the optimum temperature being 37° C. when it is produced in greatest amount and at the greatest rate. Moreover, it is found also that the reaction causes complement fixation—i.e., the complement-antibody-antigen mixture after the formation of anaphylatoxin contains less complement than was put into it, perhaps none at all. Friedberger, therefore, holds that the first injection of an antigen brings about an increase in the antibody present, which, together with the complement normally contained in the blood, immediately reacts with the second dose of antigen, so liberating anaphylatoxin.

That the process is not absolutely so simple as this is shown, however, by an experiment by Pearce and Eisenbrey, who exsanguinated a sensitised dog and replaced its blood by that of a normal dog, while the blood removed from the former was used to transfuse a third (normal) dog previously bled sufficiently to avoid plethora. They thus had a sensitised dog containing normal blood and a normal dog containing sensitised blood. Injection of a toxic dose of antigen into each caused death of the former and no symptoms in the latter, showing that the tissue cells are capable of producing the specific poison. This is only to be expected when it is remembered that the antibody is produced within these cells, and naturally, therefore, they would contain that substance to excess after sensitisation. It is thus evident that, as a rule, both the cells and the serum play their part in the reaction of anaphylaxis.

This theory supplies a simple explanation of all the known phenomena in question and shows their relation to the previously discovered processes of immunity—i.e., accounts for it as a true antigen-antibody reaction. Thus in a normal animal, antibody, if it exists at all, is present only in very small amount. A single dose of antigen, producing first a negative phase, subsequently calls forth a larger amount of antibody than in the untreated animal. These two processes explain the latent, or incubation period, during which no sensitisation is found. At the end of that period antibody is present in such amount that a second injection of antigen is almost at once subjected to lysis with the production of anaphylatoxin as *in vitro*; but in cases where by repeated injections immunity has been conferred the lysis proceeds even more rapidly than above, with the result that the toxic stage of proteolysis is so rapidly passed and the non-toxic stage reached that there is never sufficient toxin in the blood at any one time to cause symptoms.

For the serum disease of man, also, it supplies a simple explanation. It has been observed by numerous workers in connexion with the production of precipitins that there may exist in the blood of an animal both antigen and specific antibody side by side at the same time without precipitation occurring. Applying this fact to the case of a rash, joint pains, &c., developing after a first injection in man, it is known that the antigen in the blood gradually diminishes, while about the eighth day antibody has developed in large quantity; it is, therefore, probable that now both are present together, and when certain favourable concentrations relative to each other are reached reaction will, of course, take place, and the serum disease is the result.

It has also been abundantly shown that antibodies steadily disappear from the blood of an immune animal, but the cells remain more sensitive, and so, when necessary, antibodies are again formed more readily than in non-immune animals. An individual, therefore, who has received one dose of antigen will, if left long enough, eventually lose all antibody, but a second injection will bring about their more rapid production, and again when suitable concentrations of antigen and antibody are reached reaction results, and the reaction occurs earlier than in the case of a first injection but later than in the case of a fully sensitised animal—i.e., the reaction is accelerated but not immediate. Thus it is seen that one only of all the theories put forward comes near to satisfying criticism. Whether it will continue satisfactory as more facts are brought to light, or whether it, too,

in its turn will be found wanting and yield place to yet another, time alone can show. As present it may be accepted provisionally as the best that has been formed.

The theory of bacterial anaphylaxis is precisely similar but does not call for comment in this place.

#### Clinical Considerations.

In spite of the fact that man is less susceptible to anaphylaxis than some other animals the danger of this condition is not one to be treated lightly in administering sera prophylactically or therapeutically. Even though the condition be comparatively mild, no one who has seen a case would desire the experience, still less would he who has once experienced it desire to repeat the experiment. Much work has therefore been done with a view to providing a method by which a sensitised person may be desensitised—i.e., rendered anti-anaphylactic—and, secondly, to curing the condition once it is established. Obviously the former is the more important, and for this the first essential is to recognise when the individual is sensitive. As has been seen, this is at present impossible with any certainty, so until proof to the contrary is forthcoming it must be assumed that anyone who has received one or more injections more than 14 days previously is in this state.

No satisfactory theory has yet been found to explain the development of anti-anaphylaxis, and the methods of producing it are for the present entirely empirical. In the first place, then, it must be thoroughly appreciated that unlike the hypersensitive state the refractory is but transitory and the former sooner or later returns, though perhaps to a somewhat less degree. A massive first dose in many cases requires longer to produce hypersusceptibility than a smaller, but does not cause anti-anaphylaxis as was formerly thought. The administration of lecithin was also said to prevent anaphylaxis, but this has been denied by others. Again, some workers showed that anaesthesia with ether produced it, but this, too, has been later denied, and it seems that its only action is to mask symptoms while it does not prevent death. So much doubt has been cast upon these methods that they cannot be relied upon and are of no practical value in the treatment of man. The following, on the contrary, are not open to this objection and rest upon a firmer basis of experimental proof. The first of these is starvation, as pointed out by Leené and Dreyfus. Hypersensitive animals deprived of all food and allowed only water for four to five days are at the end of that period refractory to a second dose of antigen. While, however, the desired object is thus attained the procedure is obviously unsuitable for clinical application, more especially as other and quite as efficient methods are available.

Vaccination against anaphylaxis may be employed by the injection of small doses of antigen during the incubation period, but to be effective these must be given late in the period, about the seventh, eighth, or ninth day, and have no such protective action if administered early—i.e., about the third, fourth, or fifth day. Once the hypersensitive state is established no use can be made of this method.

If 5 to 10 c.c. of the antigen be given into the rectum, this having first been thoroughly cleaned out, the individual is rendered refractory from 10 to 12 hours later, and further subcutaneous injections may be carried out with impunity. The antigen is very slowly absorbed when given by this route, which is probably the reason for the subsequent desensitisation, it having also been found that if the antigen be administered subcutaneously in such a manner as to ensure an extremely slow entry—e.g., after the fashion of a subcutaneous saline infusion—very large amounts may be tolerated, which if given rapidly in the usual way would certainly cause death. Both these methods present certain drawbacks in that they are inconvenient and occupy a comparatively long time. Finally there are two methods similar in principle but differing slightly in detail by which anti-anaphylaxis may be certainly effected with but very little trouble. In considering the phenomena of hypersusceptibility it was seen that the effective toxicogenic dose was very considerably greater than the sensitising—that there was a definite minimum below which the antigen failed to elicit anaphylactic shock. This fact is here made use of, for by the injection of such a subminimal dose the individual is thereafter rendered refractory for a time, during which further and even large doses may be safely given. In man sensitisation rarely if ever reaches such intensity as to cause reaction with 1 c.c. of blood serum, so that in the use of

diphtheria or tetanus antitoxin, if it be considered unsafe to inject a large dose at once, 0·5 to 1·0 c.c. may be used as a preliminary injection, followed five or six hours later by any further dose that may be considered necessary. Should even greater rapidity be desirable, such a preliminary dose may be followed in 5 or 10 minutes by a larger and every 5 minutes or so afterwards by steadily increasing amounts whereby in a very short time enormous doses may be given and without risk of anaphylactic shock. In the case of tetanus antitoxin where prophylactic doses are given these are practically all innocuous. The amount of serum actually employed varies from 3 to 5 c.c., according to the concentration of the sample. An interval of anything up to five weeks between two such doses will never give rise to symptoms. About the sixth week, however, hypersensitivity may appear. These remarks do not, of course, refer to those patients who have received previous massive injections—e.g., for declared tetanus or who require subsequent massive injections for therapeutic purposes. In such circumstances every precaution must be taken as indicated above.

It is obvious that nothing can be done to guard against the reaction after a first injection, as the individual gives no indication of his increased sensitiveness.

If the foregoing facts be borne in mind and the proper steps taken to avoid anaphylactic shock, there should rarely be any call for the treatment of that condition. Should it arise, however, every effort must, of course, be made to afford immediate relief. In mild cases the attack may be over before treatment can be applied; if more severe the exhibition of certain drugs may prove of service: such are atropine, adrenalin, chloral hydrate, and pure oxygen. In using either of the first two substances, subcutaneous injection is far too slow a method to be of use; they must be given intramuscularly or intravenously. In cases of still greater severity artificial respiration may be necessary and may alone succeed in tiding the patient over the period of shock, but is better used in association with one or other of the above-mentioned drugs. In a few instances of the utmost gravity no efforts will be of any avail, and death ensues. As regards the local signs, treatment is rarely called for. Much pain and swelling find relief in a hot fomentation, while irritation is allayed by moistening the surface of the part with 1 in 60 solution of carbolic acid.

#### Summary.

In conclusion it may be stated: (1) that man, like other animals, is liable to become anaphylactic; (2) that no certain indications of the existence of the state in him are yet available; (3) that there are certain methods by which the danger may be simply and altogether avoided; (4) that anaphylactic shock in man is very rarely of great severity; (5) that it can almost always be cut short and the patient restored by suitable therapeutic measures; and (6) that fear of this condition can never justify failure to employ antitoxic sera both prophylactically and therapeutically in those cases where it is indicated.

## TRAUMATIC RUPTURE OF THE JEJUNUM; OPERATION; RECOVERY.

By W. SAMPSON HANDLEY, M.S. LOND., F.R.C.S. ENG.,  
SURGEON TO THE MIDDLESEX HOSPITAL.

THE following case of traumatic rupture of the jejunum has points of interest in addition to its fortunate issue.

Miss —, aged about 25, while crossing a street, was knocked down by a motor bus, and one of the front wheels was said to have passed right over her abdomen. The patient herself could not remember anything of the accident. She was admitted to the Middlesex Hospital immediately in a state of profound shock. One or two fractured ribs were present on the left side, apparently the eighth and ninth. There was no visible bruising of the abdomen. The patient was rather pale, but not bloodless, the pulse slow, about 70, and very small, and the extremities rather cold. Her facial appearance was that of intense pain. The abdomen was absolutely and uniformly rigid all over. There were no areas of dullness, no loss of liver resonance, and the only localising sign was the fracture of the ribs. It was evident that some serious internal injury was present, most probably a rupture of the spleen, and immediate operation was undertaken. An incision was made in the left semilunar line. Owing to the difficulties presented by a long thorax this was subsequently

extended obliquely upwards and inwards across the rectus muscle and then upwards in the middle line to the ensiform cartilage, thus assuming a bayonet shape. On opening the abdomen a certain amount of fluid came out, but there was no large amount of haemorrhage. No gas escaped, but there was a little fluid which suggested intestinal contents. The spleen was exposed with much difficulty, since it was small in size and situated high up in the arch of the diaphragm. There was some bleeding from its pedicle, but the large vessels were evidently uninjured. The small intestine was now investigated, beginning at the duodeno-jejunal flexure. Almost immediately, at a point six inches below this flexure, the small intestine was found to be torn completely across. The tear was a fairly clean one, not extending beyond the intestinal edge of the mesentery, and haemorrhage had ceased.

My first intention was to resect the bowel, but upon consideration there seemed no reason for subjecting the patient to this additional shock. I decided simply to join the bowel by making an end-to-end anastomosis; this was quickly done. A piece of gauze was packed down to the bleeding area near the spleen, and the incision was closed after washing out the abdomen in every part with a large quantity of saline and introducing a pelvic drainage-tube just above the pubes. A considerable quantity of intestinal contents was found to be present in the pelvis, and but for the lavage and drainage the patient would probably have had subsequent peritonitis and intestinal obstruction. At the end of the operation, which occupied about half an hour, the pulse was about 120.

The after-treatment included starvation diet for some days. During this period nutrition was maintained by two subcutaneous injections of normal horse serum. The day after the operation the patient vomited several times; no flatus had been passed and there seemed to be threatened intestinal obstruction. These symptoms, however, passed off upon the administration of eserine in doses of 1/40th of a grain subcutaneously three times a day. The eserine was supplemented by the use of injections of pituitary extract. From the fourth day the patient's condition gave rise to no anxiety, and she made a complete and rapid recovery. Solid food was first permitted about a fortnight after the operation.

I believe the favourable result of the case is largely to be attributed to my abstention from resection. The patient was in a state of deep shock, and it seemed very probable that the resection would have proved too much for her powers of resistance. It seems likely that the wheel of the bus did not pass completely over the abdomen, but that it crushed in the left side of the chest, and was arrested in the neighbourhood of the vertebral column. In its course it must have stretched and pressed backwards into the left kidney pouch the highest portion of the jejunum. Thus the transverse tear across the bowel was produced by tension and not by crushing. This, at any rate, was the conclusion at which I arrived.

A similar successful case of traumatic rupture of the jejunum near the duodeno-jejunal flexure was recorded by Mr. R. P. Rowlands.<sup>1</sup> In Mr. Rowlands's case there was a very large laceration 2½ inches long running obliquely across the dilated oedematous jejunum about a foot below the duodeno-jejunal flexure. The lacerated bowel was lying far back in the left flank near the spleen. The tear was closed by a two-layer continuous suture. The mesenteric border of the bowel had not been divided.

Berry and Giuseppi<sup>2</sup> found the mortality of rupture of the intestine from contusion in the records of ten London hospitals previous to 1908 to be 80 per cent. (67 deaths in 84 cases). Siegel's statistics, quoted by Rowlands, emphasise the importance of early operation.

Cases operated upon in first—	Mortality.
4 hours ... ... ... ...	15·2 per cent.
5-8 " " " "	44·4 "
9-12 " " " "	63·6 "
Later ... ... ... ...	70 "

The main interest of my own case is, I think, that it shows the possibility, and suggests the advisability, of avoiding resection even when the bowel has been completely torn across.

<sup>1</sup> THE LANCET, Feb. 26th, 1916, p. 459.  
<sup>2</sup> Transactions of the Medical Society of London, 1908.

## Reviews and Notices of Books.

### An Introduction to Neurology.

By C. JUDSON HERRICK, Professor of Neurology in the University of Chicago. Illustrated. London and Philadelphia: W. B. Saunders Company. 1916. Pp. 360. Price 7s. 6d. net.

WHEN any branch of science has developed sufficiently to justify the appearance of a 350-page closely printed volume as a mere "introduction" to the subject, it may fairly be regarded as a subject whose field is wide and widening, and whose study is difficult and calls for application. The author's remark that neurology is a science whose study is intrinsically difficult if the student is to advance beyond superficial phases is not only the bare truth, it also explains the importance of grasping fundamental principles of nervous structure and function as a preliminary essential to their application in any of the subdivisions of science—medicine, psychology, sociology, education—where knowledge of the nervous system in man is required.

Professor Herrick's book comprises a series of chapters on (1) the structural elements of the nervous system and the phenomena of nervous activity; (2) the special anatomy of the various functional systems, such as those of the spinal cord, medulla, cerebellum, vestibular apparatus, auditory apparatus, visual apparatus, visceral apparatus, and so on, and the physiology of the same; and (3) the structure and functions of the cerebral cortex. Each of the chapters concludes with a summary of its contents and with a short bibliography of the more important papers bearing on its subject. In addition, there is a full index and glossary at the end of the volume. The illustrations are clear and accurate.

A book like this requires to be studied. It is full of information, both anatomical and physiological, and its instructiveness is enhanced both by frequent reference to clinical data and by the use that is made of comparative anatomy and, to a less extent, comparative physiology. The author is more content to state various hypotheses that hold the field in regard to any particular neurological problem than to adjudicate between them. The paragraphs devoted to the sympathetic system do not appear to give as clear a view of its physiology as might be desired, and there is little attempt to elaborate the niceties of cerebellar function. It is easy, however, to suggest additions when the subject is so large, while the author expressly eschews details in his desire to formulate general principles. On the whole the book is stronger on the anatomical than on the physiological side. Its merits are many, and it will be found to provide the student and the physician with an excellent summary of modern teaching, as based on recent research into the anatomy and physiology of the most complex system of the human body.

### A Practical Guide to X Rays, Electro-therapeutics, and Radium Therapy.

By A. E. WALTER, M.R.O.S., L.R.C.P. Lond., Major, Indian Medical Service, &c. Calcutta: Thacker, Spink, and Co. 1916. Pp. 234. Price 10s. 6d. net.

IN writing this book the author has attempted to cover the whole field as stated in the title and to deal also with elementary electricity and the use and management of machinery for the production of electric power. He has included descriptions of nearly every known X ray apparatus as well as those used in electro-therapeutics. It is evident that we cannot look for any extended dissertation on any one subject, seeing that the whole is comprised in a volume of moderate dimensions. Under ordinary circumstances it would be a fair criticism that the author has attempted too much within the space he has allowed himself, but we have to remember that this book is mainly intended for those whose duty carries them to the outposts of Empire where information and appliances are not easily obtained, and where at times both ingenuity and resource are tested to the utmost. Looked at in this light the book fulfils its function well, and it will be of the utmost service to those for whom it has been written. Major Walter has the art of giving information clearly, and with a degree of conciseness that is seldom found, and for this reason it is a

book that the beginner, at least, cannot afford to read hurriedly, so closely are the facts packed together. It may be said that when the contents of this volume have been mastered the student will have gained a very fair all-round knowledge of X rays and electricity in their medical applications, and will be in a position not only to do good work but to appreciate the writings of the more advanced workers.

### Cleft Palate and Hare Lip.

By Sir W. ARBUTHNOT LANE, Bart., M.S. Lond., F.R.C.S. Eng., Surgeon to Guy's Hospital and to the Hospital for Sick Children, Great Ormond-street. Third edition. London: Adlard and Son. 1916. Pp. 102. Price 10s.

To this edition of his short but well-known work the author has made some additions, and especially he gives now an account of those measures which are requisite in many cases to render the condition of the patient as normal as possible after operation. The operation for cleft palate devised by the late Mr. Davies-Colley and now used extensively throughout the surgical profession was largely made known by Sir Arbuthnot Lane. The case for this operation is well put forward, but the relative merits of this and the Langenbeck operation are not discussed. Numerous excellent diagrams explain very clearly the operative procedures. A chapter on the speech training after palate operations has been contributed by Mr. Cortlandt MacMahon; this contains an account of the methods which should be adopted to remedy the remaining defects. The dental treatment of cleft palate is described by Mr. W. Warwick James, and an account is given of the prosthetic appliances which may be required.

### Roentgenographic Diagnosis of Dental Infection in Systemic Diseases.

By SINCLAIR TOUSEY, A.M., M.D. Illustrated. New York: Paul B. Hoeber. Pp. 75. Price \$1.50.

THE aim of the author is to show that teeth which may appear clinically healthy are frequently the foci of infection, and he points out that these foci can only be reliably diagnosed by means of the X rays. The book is well illustrated with skiagrams of the teeth obtained by means of films. Skiagrams obtained in the ordinary way on plates are frequently quite useless as a means of diagnosis, the film being the only reliable method, and the author has done good service by showing the value of this method in X raying the teeth. For the treatment of pyorrhoea alveolaris he advocates the use of X rays and high-frequency currents, but the cases he gives are not convincing. He shows skiagrams of the dental condition in a long series of diseases, and from his text we are led to infer that he considers the dental condition as the cause; but because two conditions are associated they are not necessarily related as cause and effect. The main value of the book is in the illustrations.

### RECENT BOOKS ON CHEMISTRY.

*A System of Physical Chemistry.* By WILLIAM C. McC. LEWIS, M.A. R.U.I., D.Sc. Liverp. With diagrams. London: Longmans, Green, and Co. 1916. In two volumes. Vol. I., pp. 523; Vol. II., pp. 552. Price 9s. each volume.—These two volumes serve to illustrate the important advances in our learning which have been made during recent years as the result of the joint study of chemistry and physics. The author has given his subject a very comprehensive handling and has included in his review some of the most recent theories and their adaptations, while his references to literature are copious and valuable. Indeed, this systematic work is by no means elementary in aim and scope, and the reader is advised to familiarise himself with the broad outlines of the subject before taking up the later problems. In any case he will not read the book profitably without some knowledge of both physics and chemistry, and he will require a mathematical faculty. The book is a valuable addition to the library.

*A Text-book of Organic Chemistry for Students of Medicine and Biology.* By E. V. MCCOLLUM, Ph.D. New York: The Macmillan Company. 1916. Pp. 426. Price 10s. net.—The author expresses the hope that this book will "serve as a satisfactory text for students of medicine and others who can give but a semester to this subject, and whose interest

is in some field of biology." This is a frank acknowledgment of the limitations of the book, but it is undoubtedly useful to have a compilation more or less confined to the description of those organic compounds which are concerned in biological processes. These compounds form a large group, and so considerable ground in organic chemistry is covered. The author very properly emphasises the importance of structure and constitution, and altogether presents his subject logically. The book is a valuable preparation for the intelligent consideration of physiological questions.

*A Method for the Identification of Pure Organic Compounds.* Vol. II. By SAMUEL PARSONS MULLIKEN, Ph.D. London : Chapman and Hall, Limited ; New York : John Wiley and Sons, Inc. 1916. Pp. 327. Price 21s. net.—We reviewed at some length in THE LANCET of June 18th, 1904, the first volume of this series, which embodied the classified descriptions of about 2300 of the more important compounds of carbon with hydrogen and with hydrogen and oxygen. This second volume is no less thorough in its breadth of treatment, containing classified descriptions of about 4000 of the more important compounds of carbon with the elements nitrogen, hydrogen, and oxygen. The former volume thus deals with aldehydes, carbohydrates, acids, phenol derivatives, esters, ketones, alcohols, and hydrocarbons, while the present volume relates to organic bases, alkaloids, amino-bodies, nitro-groups, and so forth. It provides a systematic analytical procedure based on physical properties and chemical reaction, and amounts to a dictionary of physical constants and chemical characteristics or tests of the compounds coming under the order set out by the author. This compilation must have entailed an enormous amount of work, including the careful verification and revision of the proofs, and it has all been admirably done. It is hardly necessary to point out what a valuable work of reference this will prove to be to a very large section of scientific investigators.

*Organic Chemistry.* By VICTOR VON RICHTER. Vol. I., Chemistry of the Aliphatic Series. Newly translated and revised from the German edition (after Professor Edgar F. Smith's third American edition) by PERCY E. SPIELMANN, Ph.D., B.Sc., F.I.C., A.R.C.Sc. London : Kegan Paul, Trench, Trübner, and Co., Limited. 1915. Pp. 720. Price 21s. net.—The publishers explain that a year's delay has occurred in the production of this volume owing to Dr. Spielmann's employment on important work connected with explosives for the Government. This is the first time, we believe, that the German original has been directly translated in this country, previous translations into English having been done by an American author, Edgar F. Smith, professor of chemistry in the University of Pennsylvania. The present volume is a translation of the latest edition of the German original. The references to German literature (largely the "Berichte der deutschen chemischen Gesellschaft" and Liebig's "Annalen der Chemie") are very copious, but tell us only the number of the journals without giving their dates. It is thus difficult to see at once whether these references are recent, although a general inspection of the subject-matter shows that the book has been brought well up to date. The index is very complete, amounting to 40 pages in close small type, thus showing a considerable extension on previous editions. Within its compass there is no work that we know of which gives such an exhaustive list of carbon compounds, and while the descriptions are necessarily brief it is not easy to find omissions. The reader requiring fuller information has references provided. The following paragraph (page 576) on the C-alkylated barbituric acids has evidently been overlooked in the reading of the proof-sheets : "These compounds have been minutely studied on account of some of their number acting as *valuable saporifics*—e.g., C-diethyl barbituric acid (veronal) and C-dipropyl barbituric acid."

*Analytical Chemistry.* Based on the German text of F. P. TREADWELL, Ph.D. Translated and revised by WILLIAM T. HALL, S.B. Vol. I. : Qualitative Analysis. Fourth English, after the eighth German, edition. New York : John Wiley and Sons, Inc. ; London : Chapman and Hall, Limited. 1916. Pp. 538. Price 12s. 6d. net.—This book well illustrates the application of new principles to the inter-

actions concerned in analytical chemistry. The theoretical side of the subject, that is to say, has been developed, and so we find the mass action principle discussed, the ionisation theory, and the theory of oxidation and reduction. The reactions throughout are expressed in equations with the ion signs, and when reversible the sign of the double arrow  $\rightleftharpoons$  is used in place of the equality sign =. The materials of the book are well chosen and the descriptions are up to date, while the selection of tests is clearly based on a practical acquaintance with satisfactory procedure. There is an obvious knowledge of the fallacies which creep into analytical literature. While the author introduces much that is novel, he adopts improvements on the well-known classical tests, bringing them into a line with new facilities and improved reagents. As an example of a refinement in the work of chemical detection may be mentioned the exquisite test for the presence of mercury vapour in the air. This test is said to be so extremely sensitive that a blank test performed in places where work with mercury has been performed will often show the presence of this element in the atmosphere. It depends upon the absorption of mercury by gold-leaf placed in a tube through which the air is aspirated. The leaf is then placed in an exhausted tube previously washed out with hydrogen. An electric discharge is next passed through the tube, and the characteristic green line in the spectrum is distinctly visible in the presence of the merest trace of mercury. The test is still more sensitive when the gold-leaf is warmed.

#### JOURNALS.

*Journal of Physiology.* Edited by J. N. Langley, Sc.D., F.R.S. Cambridge University Press. 1916. Vol. L., No. 5, pp. 265-344, price 6s. ; No. 6, pp. 345-390, price 3s. ; No. 7, pp. 391-458, price 5s.—On Anaphylactic Effects as shown in Perfusion Experiments on the Excised Heart, by A. S. Leyton, H. G. Leyton, and S. C. M. Sowton. Alien serum was perfused through excised hearts, the muscle of which had been sensitised by a previous injection of a small dose of an alien serum. The results do not lend themselves to summary.—Variations in the Blood Sugar in Health, by George Graham. The sugar was investigated by a modification of Bang's method in the author's blood at intervals for over one year, and it was found to vary between 0.1 and 0.13 per cent. The ingestion of 100 gm. of glucose produced a sudden rise in the blood sugar, apparent 10 minutes later and usually reaching its maximum in 20 minutes, and falling to its original level in one to one and a half hours. Under conditions which cause fatigue the blood sugar rose to a greater height and took three to four hours to fall to its original level. The author suggests that in the normal rise the "extra" sugar is on its way to the muscles and other storehouses, and that the rise which takes place in fatigue is due to slight failure of the muscles and other storehouses.—The Regulation of Excretion of Water by the Kidneys, by J. S. Haldane and J. G. Priestley. The authors find that the enormous diuresis caused by ingestion of water is not dependent on general dilution of the blood with liquid and that the diminished excretion of urine following great sweating is not dependent on the general concentration of the blood, although some general concentration may occur.—The Biological Mechanism of Growth, by W. Cramer. The author continues his researches on growth as manifested in transplantation of neoplasms.—Observations on Denerivated Muscle, by J. N. Langley. The atrophy of denervated muscle is shown to be not merely a disuse atrophy due to the absence of contraction.—The Recovery of Conductivity and of Excitability in Nerve, by E. D. Adrian. The experiments show that the recovery of conductivity is probably complete at the moment when recovery of excitability is complete.—The Function of Hæmoglobin in Invertebrates, with Special Reference to Planorbis and Chironomus Larvae, by I. Leitch. The author finds that in these larvae the function of hæmoglobin consists in making available, by its power of binding oxygen chemically, a quantity of oxygen sufficient for the needs of the animals at oxygen tension so low that the necessary amount is not supplied by physical solution. The experiments were conducted

under the direction of Professor Krogh in Copenhagen.—The Effects on Higher Animals of the Sterilisation of the Inhabited Medium, the Air and the Food, by I. Kianzin. Much difference of opinion prevails as to the effect of micro-organisms on higher animal life. The author has been engaged investigating this subject at intervals from 1894. He gives a summary of other workers in the same or similar fields. Observations—micro-organisms being excluded, sometimes from the air or food, or both—have been made by many other observers on guinea-pigs, tadpoles, and chickens obtained from sterilised eggs. Some of the observers found that the absence or partial absence of micro-organisms has a deleterious effect on nutrition. From his own observations on mammals of the effect on the assimilation and dissimilation of nitrogen, on sterilising the air and food supplied to them, the author found that there was a decrease of nitrogen assimilation and that death soon followed, varying in different animals. The more fatal results in his observations the author attributes to a more complete absence of micro-organisms in the air, and concludes that the micro-organisms of air are essential to life. Not only is there an imperfect assimilation of N compounds, but there is a large increase of leucomaines. —Slow Waves of Contraction in Muscle, by J. N. Langley. As long ago as 1858 Schiff observed that on mechanical stimulation of mammalian muscle a short time after death a slow wave of contraction proceeded from each side of the point struck, and on arriving at the end of the muscle was reflected backward. In the meantime another wave had been set up at the stimulated spot and crossed the reflected wave, which was in its turn reflected. Since then it has been found that slow waves of contraction occur in normal muscle. It has been suggested that the contraction is a sarcoplasic and not a fibrillar contraction. So far it does not appear that such waves due to chemical stimulation have been described. The author has made observations especially upon the effects of sodium sulphocyanide, which produces waves with considerable constancy. They can be set up in the nerve-free ends of the sartorius of the frog as well as in the middle region, and they are not prevented by curarisation. The ease with which they can be set up by direct application of 2 per cent. sodium sulphocyanide in Ringer's fluid varies with different muscles. They are readily obtained in the leg muscles. Other drugs, such as eserine salicylate, were also used.—The Action of Sodium Sulphocyanide on Muscle, by J. N. Langley. The author confirms in general the observation that sodium sulphocyanide (2 per cent.) applied to a frog's gastrocnemius muscle causes strong primary contraction, followed by contracture and by frequent twitchings. The effects, however, vary with the condition of the muscle itself and also with individual muscles. Some of the effects are prevented by curari, others not. The action of the drug in some respects resembles that of guanidine, and in others that of nicotine. Guanidine, when applied to a small spot of a muscle, often causes twitching, not only where it is applied, but at some part of the muscle more or less remote from this, best in submaxillary and gracilis. Reasons are given for thinking that this widespread of contraction is due to axon reflexes, and not to fluid.—The Influence of the Vagus on Pancreatic Secretion (No. 2), by G. V. Anrep. This is a supplement to a previous paper,<sup>1</sup> already referred to in THE LANCET. In a decerebrate dog stimulation of the peripheral end of the vagus at first is generally without effect on the pancreatic secretion; but there follows after a long latent period a secretion which reaches its maximum only after the end of stimulation. With repetition of the stimulation the flow of juice may start within a few seconds after stimulation is begun. The gland would seem to be in a state of inhibition during the long latent period—all secretory action of the pancreas is blocked, the secretory capacity of the gland is diminished. The vagus exerts the same inhibitory action on a secretion obtained by injecting HCl into the duodenum, or secretin into the veins. The author finds that:—1. Stimulation of the splanchnics or obstruction of the aorta causes a diminution of the pancreatic secretion—the former may even cause complete arrest. If the secretion is rapid, the strongest stimulation of the splanchnic nerve causes only a slowing, never an arrest. Aortic compression is more effective, and it finally stops the secretion in every case. 2. The vagus has no vaso-constrictor.

nor vaso-dilator fibres to the pancreas. 3. Stimulation of the vagus causes a dilatation of the pancreas; when secretion begins the dilatation finishes, and the gland comes to its normal volume. 4. The dilatation is abolished by atropine when secretion is abolished. 5. Vagal "inhibition" of the pancreatic secretion is accompanied by a dilatation of the gland strictly coinciding with the time of this inhibition. 6. The dilatation is the result of a constriction of the pancreatic ducts or of a retention of the juice in the glandular cells which secrete it.—The Direct and Indirect Effects of X rays on the Thymus Gland and Reproductive Organs of White Rats, by Evelyn E. Hewer. As both thymus and reproductive organs are affected by X rays it was expected that irradiation of one organ might bring some light to the question of its relation to the other organ. We can only quote a few of the author's results. Direct irradiation of the thymus does not determine the appearance of Hassall's corpuscles unless the gonads are simultaneously treated. Irradiation of the thymus only causes slight degeneration of the male gonads and delay of sexual maturity, but no alteration in the female. As to irradiation of the male gonads, degeneration occurs and the affected cells are set free in the lumen of the tubules by desquamation. Regeneration is possible, depending on the age of the animal and the total dose of X rays. If the spermatogonia are all destroyed no regeneration can occur. Hassall's corpuscles always appear, but disappear in time. Excessive vascularisation of the suprarenal and hypertrophy of the islands of Langerhans sometimes occurs. A very weak total dose accelerates sexual development. Irradiation of female gonads shows that young ova are more resistant than older, while the corpora lutea become abnormally vascular and the hypertrophy of the interstitial gland is constant and persists even after apparent regeneration of the ovary.

*Journal of Cancer Research.* Baltimore: Williams and Wilkins Company. Price 23s. per annum.—In the last issue of this quarterly magazine, dated October, 1916, but not published till quite recently, Professor G. N. Calkins continues his studies of the effects of cancer tissue, embryonic tissue, and normal tissue on the vitality of protozoa, using *Didinium nasutum* again as indicator.—Dr. L. Loeb and Dr. M. S. Fleisher describe in great detail transplantations of benign tumours of the rat, mostly adenofibromata.—The number includes an account of a case of primary carcinoma of the ureter, by Dr. E. C. Schmidt, in which the 19 cases previously recorded in the literature are analysed. The contribution to the question of cancer heredity by Miss M. Slye, entitled "The Inheritance of Spontaneous Tumours of Specific Organs and of Specific Types in Mice," is important. Miss Slye concludes that the predisposition to develop cancer of certain organs is inheritable. Genealogical trees are given of a number of strains in which cancer of the lungs or liver, for example, occurs with abnormal frequency. It is rather disconcerting, however, to find that in the cases of the lung and the liver metastatic tumours are grouped with primary growth in calculating the percentage frequency of deaths from cancer in these strains. Even without the metastatic growths the tendency to aggregation of primary cancer of specific organs in single strains is evident, but naturally not to the same extent.

**ROYAL COLLEGE OF SURGEONS OF ENGLAND.**—A quarterly meeting of the Council was held on Jan. 11th, Sir William Watson Cheyne, the President, being in the chair. The best thanks of the Council were given to Dr. W. Colin Mackenzie, of Melbourne, Australia, for presenting to the College his collection of marsupial and monotreme material used by him for the purpose of an investigation, carried out in the Museum workrooms, relating to the anatomy and physiology of the animals which are native to Australia. In reply to a letter from the War Office the Council stated the arrangements which they considered might be made for placing on exhibition a selection of pathological specimens from military sources of which the College are taking care for the War Office. New by-laws were ordained for giving Fellows resident abroad facilities for voting for members of Council, and steps are about to be taken to submit them to the Crown for approval. Mr. F. F. Burghard was appointed a member of the Committee of Reference.

# THE LANCET.

LONDON: SATURDAY, JANUARY 20, 1917.

## Mobilisation of the Medical Profession.

FROM previous articles which have appeared in these columns it is well known to our readers that a very important and critical point has been reached in the position of the medical profession with regard to the supply of doctors for the Navy and Army, principally, of course, with regard to the supply for the latter service. The methods under discussion to arrive at a satisfactory scheme have been alluded to by the medical correspondent of the *Times*. While everyone knows that debates of an important character have been taking place in regard to the mobilisation of doctors, to-day we are able to announce that representatives of the Central Medical War Committee, of the Committee of Reference of the English Royal Colleges of Physicians and Surgeons, and of the Scottish Medical Service Emergency Committee are seeking an early interview with the Director of Public Services, having submitted a memorandum on the many problems involved.

The main question at issue is whether the medical profession should or should not mobilise itself as a separate entity under the Director of National Service, this being an immediate response to the statement of the Prime Minister, who, when speaking of the whole population, intimated that, where voluntary mobilisation did not fulfil expectations, compulsory powers would have to be sought. Put quite crudely, Mr. LLOYD GEORGE's intimation was that, speaking of the community at large, where volunteer services were found to be inadequate, general conscription would be employed, so as to ensure that every man in the country, during the critical position in which the State is now placed, should give his help how, when, and where he is best qualified to do so. For it is common knowledge that at the present moment there is not only a large number of people who are shirking their responsibilities, but that there is a still larger number whose potentialities for good are not properly utilised, and who may be doing, as well as they can, things for which they are unfitted, while activities for which they have real qualifications are neglected or remain in other hands. We must all feel that, as far as the medical profession is concerned, we want to be free from such reproach, for economy of labour is necessary for our national welfare. The country is absolutely sound in its resolve to proceed to the unquestioned and commanding success which, though so long delayed, has become inevitable by the trend of naval

and military affairs. This resolve is quite general and unfaltering, but the measure of delay in the accomplishment of our great aims is the measure of the widespread trouble in which we all abide, as well as of the incalculable misery to those who are under the heel of the invader. The shortest possible term must be put to this position, and while the one and only argument that will prevail is the possession by our cause of incomparable fighting forces, the duty before all sections of the population is to keep those forces at a standard of perfection. When the medical profession is told that doctors are and will be required for the army, we medical men know that in some way or other they must be found.

The medical profession is the one section of the community which is already equipped for its work. The duty of a medical man in times of war, as in times of peace, is primarily to prevent disease or injury and, secondarily, to remedy disease or injury. It is not a question of the dyer making explosives, of the bicycle or the piano manufactory being employed for the manufacture of war material, of the governess becoming a milkmaid, or of the judge becoming a chemist. The doctor who practised before the war is ready-made in all essentials to be the doctor during the war, but if a full value is to be got out of his specialised services, and if the limited supply of personnel is to meet a practically unlimited demand, the greatest possible economy must be exercised. Square pegs must be put into square holes, and overlapping must be guarded against. Moreover, offers of part-time assistance must not be despised as partial patriotism; and especially must this view be discountenanced where it can be proved that, not only would the part-time service enable others to offer whole-time service, but that the rest of the time of the partly employed doctor with the troops could be utilised for the good of the State in a civilian capacity. To our mind all this means one thing only—it means that any organisation of the medical profession to meet the emergencies of the situation should be carried out under the assistance and guidance of members of that profession. They are familiar with the possibilities and limitations of medicine and with the characteristics of the help that can be offered by individual medical practitioners; they are also aware of the amount of work which must be discharged by medical men to keep the civilian population in health. We are all in this war—man, woman, and child; that is what the Prime Minister meant in his reference to the determination to seek compulsory powers with regard to the whole of the community if voluntary mobilisation failed. But by as much as we are all in this war, by so much is it necessary that the health of us all should be maintained, so that our general efficiency for attack or resistance should remain at the high level that can be only expected from a physically sound people. If the medical profession is mobilised as a separate entity under the Director of National Service, but in accordance with its own experience and knowledge, the three statutory committees now existing—namely, the Central Medical War Committee, the Committee of

Reference of the English Royal Colleges, and the Scottish Medical Service Emergency Committee—would form the organisation necessary to carry out the work, allowing for modifications which it would not be difficult to bring about. The task before these Committees, however strengthened, must be difficult, but they possess the information and experience. More doctors are required for the Army, and at the same time the number of men discharged as disabled grows, and the medical care of the munition workers increases in urgency. The number of doctors of military age who can possibly be spared from their districts is now becoming small. These facts indicate that there must not be delay in meeting the situation by a definite line of action.

### Tetanus and the Use of Protective Serum.

TETANUS is no longer a frequent complication of gunshot wounds, but it is still, when it occurs, so likely to be fatal and so horribly painful to the patient that no efforts can be too great to get rid of the disease altogether. In the home military hospitals during the year ending July 31st, 1916, we know from Sir DAVID BRUCE's analysis which we published on Dec. 2nd last, that 195 cases of tetanus were received, of which 96 died. The number received varied greatly from month to month, roughly in proportion to the total number of gunshot wounds. No obvious falling off occurred during the year, and there is at the present moment some evidence to hand of an increasing number of cases, some of them being of the fulminant variety so tragically common in the ranks of all the combatants during the early months of the war.

As a prophylactic injection of protective serum is now a routine measure at the front in every case of gunshot wound, it is evident that the protection afforded by a single injection is not complete. The official Memorandum on Tetanus<sup>1</sup> advised the repetition of the serum injection in all septic cases at intervals of seven days in order to keep up the protection, but Sir DAVID BRUCE commented in his analysis on the fact that there was no record of the employment of serum as a prophylactic in the home military hospitals. Possibly the fear of harmful effects from repeated injections of horse serum may have acted as a deterrent, for "serum disease," as it may still conveniently be called, may be a very serious matter when it occurs—witness the rapid death from anaphylactic shock of animals injected with foreign protein appropriately dosed and spaced. It is well, therefore, to recall the statement in the Memorandum that the danger of anaphylactic shock is negligible when the prophylactic dose is contained in such a small quantity as 3 c.c. of horse serum, whatever the interval after the preceding injections. Highly concentrated serum in doses sufficient to maintain protection may be repeated at weekly intervals as long as is considered advisable without any fear of the occurrence of anaphylaxis.

So much for prophylaxis. The case is somewhat different in regard to the massive doses demanded in curative treatment after symptoms of toxæmia have already shown themselves. The large doses of horse protein which necessarily accompany the requisite number of antitoxic units may be a source of inconvenience or danger. The paper by Captain S. WYARD, R.A.M.C., which we print this week, sets out clearly and simply how these inconveniences can be entirely avoided. A small rectal injection of antigen within 12 hours renders the individual refractory to a subcutaneous dose of any size, or if this amount of delay is held inadvisable the same result can be obtained by a succession of subcutaneous doses, beginning with a very small dose and rapidly rising to a large and efficient one. Observance of these precautions should be sufficient to remove all risks of anaphylaxis, and the fear of its occurrence can no longer justify the failure to employ protective serum in every case where it can possibly be of service.

### Annotations.

"Ne quid nimis."

### NEW FOOD ORDERS.

THE new Orders issued by the Food Controller last week will disturb still further part of the customary dietary of most of us. An increased economy of wheat material is suggested, and instead of 76 per cent. now extracted from the grain, a further 5 per cent., making a total of 81 per cent., is insisted upon. The Order is probably based upon the fact that the public have found the new bread acceptable, and, that being so, a further extraction of 5 per cent. from the total grain will produce an equally acceptable loaf and effect a further important economy. For the first time, however, an option is given to the miller to mix with the wheat flour derived from barley, maize, rice, or oats to the extent of 10 per cent. This means that the miller need not mill his wheat further than the original allowance of 76 per cent. if, as an alternative, he chooses to add a proportion of other flours. We made a similar suggestion to this in a leading article in THE LANCET of Jan. 30th, 1915, when we said it would be possible to add to rich gluten flours a proportion of starch, as, for example, maize flour (cornflour), without materially reducing the nitrogen value when compared with a low-grade wheat flour. The energy value of such a loaf would be quite high, while its nourishing properties would be little impaired. Maize flour or rice, however, would carry in little more food material than starch, while barley and oats would add proteins and fat, and from a dietetic point of view the loaf containing an addition of barley and oats would, likely enough, have a superior value to the loaf made with a similar proportion of maize or rice. To those who hold that bread is primarily eaten not as a source of protein, but as an easily digestible, attractive form of starch, it matters little which flour is employed. Obviously, however, the wheat substitutes can be used for no good purpose unless they are cheaper than wheat-flour itself. Apart from this question, there must be considered also the physical qualities of the loaf;

<sup>1</sup> THE LANCET, Nov. 18th, 1916, p. 873.

texture, for one thing, is an important property. It is not all cereals which will make a light, spongy bread, and wheaten flour is easily first in producing a loaf of uniform porosity which is an essential characteristic of a bread that is to be easily masticated and digestible. The lumpy, sodden loaf is unattractive besides being indigestible, and its food value may be largely discounted owing to its causing gastric difficulty. The new Order, we take it, exempts the baker from the old requirements of the Bread Act if he chooses to use other flours than wheat. According to this Act, a loaf of bread containing any other flour than wheat must be marked with a large capital letter M, and there is liability to a heavy penalty if this is neglected. The old controversy as to whether sugar is an essential in our dietary has been revived, and more than one well-known physiological authority has stated that sugar is not a natural food, inasmuch as the human economy is constructed to convert carbohydrate—e.g., starch, which they claim to be a natural foodstuff—into sugar. It is quite certain that if sugar were tasteless or not sweet it would not be so popular as it is, and so from this point of view it must rank as a condiment as well as a food. It is interesting to recall that sugar was scarcely a commercial commodity much more than a century ago, and in the time before that our ancestors got on very well without it, while, as a matter of fact, a big section of the community consumes nowadays very little or none of it. The history of starches in the dietary, however, goes back to the beginning of things, and there was always a supply of starches long before sugar was cultivated or thought of in its present form. Custom and cheapness have brought sugar into wide use, and we are glad to note that its employment in many extraneous and totally unnecessary ways is prohibited.

#### THE MORITZ-WEISS REACTION IN SURGICAL PRACTICE.

THE permanganate test was believed by its discoverer to have a special diagnostic and prognostic value in tuberculosis. Moritz-Weiss in 1911 affirmed that when the reaction was positive in the urine of persons suffering from tuberculosis the patient had little chance of recovery owing to the extension of the tuberculous process or to his small resistance to Koch's bacillus. It was further claimed that this test was superior to the diazo-reaction for several reasons: greater simplicity of technique, greater sensitiveness, and the lesser influence on it of substances given medicinally. The original technique is as follows. The urine for examination, which must be perfectly clear and not have undergone ammoniacal fermentation, is diluted with twice its volume of water. To a test-tube of this mixture three drops of a 1 per cent. aqueous solution of permanganate of potash are added and shaken. If the reaction is negative the liquid does not change colour or takes a faint violet brown tinge; if positive it becomes golden yellow. The reaction was said not to occur in normal urine, and was not produced by the ingestion of certain drugs, such as creosote and opium, which influence the diazo-reaction. Dr. Carlo Belgrano published in the Surgical Section of *Il Policlinico*, Sept. 15th, 1916, the results obtained by the systematic testing of the urine in 369 surgical patients, repeating

test at intervals so as to ascertain the behaviour of the reaction at various phases of the course of the disease. The cases included surgical tuberculosis, acute local and general inflammatory processes, gangrene, malignant tumours, and varicose ulcers. The conclusions arrived at from these experiments were to the effect that the Moritz-Weiss reaction was not specific for tuberculous disease, although it was more frequently present in diseases of this kind than in others, and that it occurred for the most part in the urine of individuals suffering from serious diseases which produce rapid cell disintegration—that is, in cases where high temperature was present associated with profuse suppuration. The reaction, according to Dr. Belgrano's observations, seemed devoid of any prognostic value, for though it almost always coincided with the phase of the greatest severity of the disease it did not necessarily indicate an unfavourable prognosis. Furthermore, the reaction disappeared and reappeared during the course of the disease, its disappearance coinciding, as a rule, with a period of improvement in the patient.

#### DOUBLE EMPYEMA SUCCESSFULLY OPERATED UPON.

CASES of operation for double empyema are rare. In the *Boston Medical and Surgical Journal* recently Dr. F. B. Lund and Dr. H. Morrison have reported the following case. A girl, aged 16, was attacked on March 30th, 1915, with epigastric pain, vomiting, headache, and slight cough. The temperature was 102° F., pulse 120, and respirations 30. There were signs of beginning consolidation at the base of the left lung. From the commencement the patient looked very ill. On April 1st her leucocyte count was only 5000. On April 2nd the right lower lobe was affected, and by the end of the ninth day the middle and lower lobes of the right lung and the lower lobe of the left were solid. The temperature ranged from 100°–101° mornings to 103°–104° evenings. There was slight cyanosis, with considerable dyspnoea, and the sputum was muco-purulent and very tenacious. The crisis failed to appear during the next six days. The patient was prostrated; she was running a septic temperature and was beginning to perspire freely. At both bases and the axillæ there developed "flatness" below the level of the angle of the scapula with distant bronchial breathing and bronchophony. Above this zone were fine crepitant râles. On April 14th she was sent to the Boston City Hospital, with the provisional diagnosis of double empyema. An X ray examination showed increased density in the left lower lobe, suggesting consolidation rather than fluid. Dr. Lund performed paracentesis in two places on each side of the chest with no result. On April 18th she began to cough up a great deal of foul pus, without relief. On April 21st the left chest was again tapped. This time a few drops of thick pus were obtained in the ninth interspace in the posterior axillary line. Resection of the ninth rib was done with the evacuation of several ounces of thick foul pus, similar to that which the patient was expectorating. Drainage was established through a rubber tube inserted obliquely, with the skin sutured over the end to act as a valve. On the following morning the patient's condition had not improved, and the right pleural cavity was explored a second time. A needle inserted through the tenth interspace near the spine, and directed upward, obtained a few drops of pus. The tenth rib was

resected near the vertebra, and a few ounces of foul pus were found between the right lung and the spine. Drainage was established through a rubber tube. The patient began to improve at once. There was profuse drainage through both tubes. The cough and expectoration gradually subsided. By the end of May both wounds were granulating, and there was very little discharge through the small sinuses. On May 29th an X ray examination showed no evidences of fluid in the chest; there was some haziness throughout both lungs, but they were well expanded. Complete recovery followed. Evidently the double empyema followed pneumonia. When the patient began to expectorate fetid pus there must have been a perforation through the lung.

#### TRICHOMONAS DYSENTERY AT AREQUIPA.

FOR a long time cases of dysentery, some of them fatal, have been occurring at Arequipa, a town of about 35,000 inhabitants situated at the foot of the Peruvian Andes. Many of these cases were recognised to be of the amebic form, but others occurred in less amount of the balantidial kind, and some of mixed forms: the prevailing type was that due to infection by *Trichomonas intestinalis*, a small protozoal parasite, which was found in abundance in the stools of the patients. Papers on this subject were published not long ago in the *Bulletin de la Société de Pathologie Exotique* (vol. vi., No. 2, and vol. vii., Nos. 8 and 9) by Dr. Edmundo Escomel, of Arequipa, who, in studying the protozoal organisms present in the potable water of that town, discovered *T. intestinalis* in the public service in adult forms and in the cystic stage. In particular, he found the organism in considerable amount in the distributing reservoir, which was inadequately protected against contamination from various sources. One of its feeders, for instance, was a small stream in which women from the town were accustomed to wash their body linen and other articles. Steps were at once taken by Dr. Escomel, who held the appointment of medical examiner of the public water-supply, to protect the water service from pollution, and particularly to guard the distributing reservoir from contamination. Since this was done trichomonas dysentery has entirely disappeared from Arequipa. It is of interest to mention that while this form of dysentery was prevalent Dr. Escomel found that no benefit followed the administration of ipecacuanha, but that considerable improvement resulted from giving the essence of terebinthine. Later, as a result of experiments *in vitro*, he found that the trichomonas organisms died as soon as they came in contact with a solution of iodine (1 in 1000). He, therefore, with success treated his later patients by enemas containing a dilute solution of iodine, and he claims for this method that, though simple, it is most efficacious in the majority of instances.

#### TWO SOUTH AFRICAN MEDICAL MEN.

A CORRESPONDENT in South Africa has called our attention to the many points in common presented by the widely differing careers of two medical men whose deaths have just occurred. Dr. Josiah Wright Matthews, an intimate friend of Cecil Rhodes, lost and made in speculation three fortunes, and died at Greytown, Natal, on Dec. 5th last, at the age of 76. Qualifying in 1864 as L.S.A. Lond., L.F.P.S. Glasg., he

graduated later as M.D., C.M., at the University of Aberdeen in 1871. His public and professional life was spent in South Africa, where he commenced practice as district surgeon at Verulam. Subsequently he became one of the pioneers of the diamond fields at Kimberley, where he did much valuable work in hospital reform. On the annexation of Griqualand to the Cape he was elected Member of Parliament for Kimberley. In later years he was a prominent public man at Barberton. As a traveller he had many interesting reminiscences to record, and these were embodied in a book which he published some years ago under the Zulu title of "Incwadi Yama." Five days later Dr. William Russell, who for many years was resident surgeon at the Kimberley Hospital, died from pneumonia, after a protracted illness, at the comparatively early age of 48 years. Dr. Russell also qualified with honours as M.D. at Aberdeen University in 1896, after having obtained his M.B., C.M. in 1890 and his D.P.H. (Eng. Conj.). He was resident surgeon for several years at Toxteth Infirmary, Liverpool, and later was superintendent of hospitals at Maidstone during the typhoid epidemic there in 1897. He was the author of a clinical record of over 500 cases of typhus fever, and also wrote a thesis on accidental rash in typhus and typhoid fevers simulating the rash of scarlet fever. Going out to South Africa in 1898, 30 years later than Dr. Matthews, Dr. Russell served for a while in temporary appointments, and later became senior house surgeon of the Kimberley Hospital, and was very popular among all classes of the people of the diamond fields. He held this office with great credit during the time when the town was besieged by the Boers, and relinquished the post three years ago in order to enter upon private practice. His tireless devotion to duty during the siege was acknowledged in an autograph letter sent to him by direction of Queen Victoria and by another from Lord Roberts.

#### A WAR-TIME PATHOLOGICAL MUSEUM.

THE collection of specimens of pathological interest from military hospitals at the Royal College of Surgeons has now reached a stage at which a selection can usefully be made for immediate study. Major T. R. Elliott, who was placed in charge of the collection and transmission of the specimens from the laboratories of the base hospitals in France, has been successful in obtaining a total, so far, of over 1100, and these have been stored and indexed. Professor S. G. Shattock, with the help of the pathological assistant to the College, is going through the specimens with a view of making a representative selection, for which purpose Mr. Raymond Johnson has placed his experience at their disposal.

THE King has appointed Sir William Whitla to be one of His Majesty's honorary physicians in Ireland in the room of the late Dr. James Little.

CENTENARIANS.—Mrs. Sarah Brooks, an Essex centenarian, died recently in her 105th year, and Mr. John Froggett has died at Offerton, Cheshire, aged 102 years and six months. He had 80 descendants, and 14 of his grandsons are serving in the Army.—Miss Bailey, of Esher, has received the congratulations of the King and the Duchess of Albany on the attainment of the 100th anniversary of her birthday.

THE LANCET, VOL. II., 1916 :  
THE INDEX.

THE Index and Title-page to the volume of THE LANCET completed with the issue of Dec. 30th will be ready on Jan. 22nd. Owing to the continued shortage in the paper-supply, the Index will not be issued with all copies of THE LANCET, as was the custom prior to the War. Subscribers who bind up their numbers are requested to send a post-card to the Manager, THE LANCET Office, 423, Strand, London, W.C., when a copy of the Index and Title-page will be supplied free of charge.

THE CONTROL OF VENEREAL DISEASES.

*The Midwife's Share in the Informal Notification of Syphilis.*

A PASSAGE in the Liverpool scheme which we have already briefly summarised calls attention to the systematic examination by the city bacteriologist of stillborn infants. Through the co-operation of the midwives Professor J. M. Beattie is now enabled to examine a large proportion of the infants born dead before term and, as Dr. E. W. Hope states in the report, has found that in a great majority of these syphilis was the cause of the stillbirth. The services of the midwife are then further utilised to induce the mother to attend at the bacteriological department for the examination of her blood by the Wassermann test. If this is found to be positive, a little further persuasion on the part of the midwife, as the recognised friend and adviser of the family, has almost without exception resulted in the treatment of one or both parents. We learn that up to the present time out of a total approaching 100 only a single individual has refused treatment for himself and his wife. No compulsion, of course, is available. It is easy to see how the trouble which the Public Health Department of Liverpool has taken to get and keep in sympathetic relations with the midwife has resulted in a helpful addition to the administrative machinery of its venereal scheme. The informal and friendly action of the midwife amounts to an effective system of voluntary notification without any of the attendant drawbacks of the latter.

*The Suppression of Unqualified Practice.*

At the quarterly meeting of the Council of the Royal College of Surgeons of England on Jan. 11th a resolution was adopted stating that it is urgently necessary, for the protection of the public, to prohibit under penalty the treatment of venereal diseases and the advertisement of such remedies by unqualified persons. The Council considered that the recommendations of the Select Committee of the House of Commons on Patent Medicines should forthwith be adopted and embodied in the proposed legislation.

A recent meeting of the Council of the Association of Municipal Corporations dealt with the same subject. A resolution, moved by the Town Clerk of Barrow-in-Furness—

That in the opinion of this association administrative measures for the diagnosis and treatment of venereal diseases will only attain their maximum effectiveness in protecting the public health when the treatment of such diseases by unqualified persons is prevented by law—was carried, and copies were forwarded to the Prime Minister and to the President of the Local Government Board, asking for the introduction of the necessary legislation as early as practicable.

*Galyl as an Approved Salvarsan Substitute.*

We have received the following letter from the Anglo-French Drug Company (Gamage Buildings, Holborn, London, E.C.) :—

We are receiving queries from medical men and hospital authorities regarding the omission of galyl from the list of approved remedies on the Local Government Board circular. They seem to be under the impression that the omission is due to some therapeutical objection—whereas it is really owing to the miscarriage of some correspondence on the

matter with the secretary of the Local Government Board. We hope to see galyl on the approval list in the very near future.

*Death Accelerated by a Salvarsan Substitute.*

An inquiry was held in the Southwark coroner's court on Jan. 6th concerning a man, aged 33, who died in Guy's Hospital after the administration of arsenobenzol. An intravenous dose of 0.4 grm. arsenobenzol was given and the patient died suddenly two hours after the injection. Dr. B. H. Spilsbury, who made a post-mortem examination and found a large tumour in the front part of the brain with extensive softening of the brain, stated his opinion that death was due to coma from disease of the brain, accelerated by the administration of arsenobenzol. A verdict of "Death by misadventure" was given.

*Campaign of Publicity.*

Two lectures of the series on public health problems, arranged by the Royal Institute of Public Health, will be devoted to the prevention and arrest of venereal disease. Dr. Mary Scharlieb deals with the subject in women on Jan. 24th and Dr. C. J. Macalister in men on Jan. 31st. On the former occasion Dr. A. Newsholme will take the chair and on the latter Lord Sydenham. Discussion is provided for after the lecture. Time and place are 4 P.M. at 37, Russell-square, London, W.C.

A course of four lectures for men has been arranged by the Liverpool Medical Institution as a branch of the National Council. The first was delivered last week by Dr. E. W. Hope on the Royal Commission's Report. Dr. R. W. MacKenna will lecture on Venereal Diseases (Jan. 19th), Professor J. M. Beattie on Social Prevention (Jan. 26th), and Dr. C. J. Macalister will preside at a conference (Feb. 2nd). Time and place are 8 P.M. at the Picton Lecture Hall, William Brown-street, Liverpool.

Sir Malcolm Morris has attempted a simple exposition of venereal diseases with special reference to their bearing upon public health in a book of 150 pages entitled "The Nation's Health," just published by Messrs. Cassell and Co. (price 3s. 6d. net). It is intended for the use of members of local authorities and of hospital boards, and for headmasters and headmistresses. The early chapters describe in non-technical language the manifestations of syphilis and gonorrhoea, their prevalence, the means of enlightenment and of providing facilities for their treatment. The questions of notification, regulation, and other administrative measures are then discussed. The book will serve a useful purpose, but the subject-matter of the book should not have been cloaked in an obscure title, the sub-title, "The Stamping Out of Venereal Diseases" not appearing on the cover at all. Undue prominence is given to a story indicating the infectiousness of syphilitic sores of the lip; the story is taken from the pages of an American journal.

*Council and Other Schemes.*

A private conference of doctors, clergy, and of citizens representative of various health, nursing, and public morals societies, was held in the City Hall, Belfast, last Thursday, to discuss the establishment of a local branch of the National Council for Combating Venereal Diseases.—Mr. F. S. Kidd lectured at the Trowbridge Council Chamber to the medical practitioners and officers of the R.A.M.C. in the county of Wilts on Wednesday last, by invitation of Dr. J. Tubb-Thomas, county medical officer. The address was on Modern Methods of Treatment and Diagnosis of Diseases of the Male Urethra.—At Exeter the local members of the medical profession have nominated Mr. A. C. Roper and Dr. Mabel E. Gates to advise the sanitary committee.—The committee of the Devon County Council, who are making arrangements with the local authorities for the treatment of venereal disease, has recommended that the following members of the medical profession should attend the meetings of the committee and advise: Mr. Russell Coombe, Mr. S. Noy Scott, Mr. Ellis Pearson, and Dr. G. F. Welsford.

**LONDON HOSPITAL MEDICAL COLLEGE.**—A course of three lectures on the Modern Treatment of Diabetes Mellitus will be given in the clinical theatre of the hospital by Dr. O. F. Leyton, physician to the hospital, on Wednesdays, Feb. 7th, 14th, and 21st, at 5.15 P.M. Members of the medical profession will be admitted on presentation of card.

## Public Health.

### ANNUAL REPORTS OF MEDICAL OFFICERS OF HEALTH.

*City of Liverpool.*—Dr. E. W. Hope's annual report for the year 1915, in common with most current annual reports of medical officers of health, is considerably reduced in size, but contains an excellent account of the activities of the public health department during the year under review. The population of Liverpool at the middle of the year 1915 was estimated at 772,595, an increase over the previous year of 4603. There were 21,586 births within the city, giving a birth-rate of 27·9 per 1000 of the population, the average of the previous five years (1910-14) being 30·0. There has thus been a considerable decline compared with preceding years, but the birth-rate of Liverpool is still well above the average of the great towns, which is 22·8 per 1000, as well as of England and Wales taken as a whole, which gives a rate of 21·8 per 1000. The total death-rate was 18·7 per 1000, as against 19·5 during the previous year. Zymotic diseases were the cause of 1959 deaths during the year, giving a rate of 2·5 per 1000, as compared with 2·6, which was the average rate for the preceding five years. As Liverpool, on account of the large number of ships continually arriving in the port, is peculiarly liable to the introduction of diseases from abroad, it is satisfactory to learn that no case of plague occurred in the city during the year. As a precautionary measure, the systematic catching and examination of rats has been further extended and all the usual preventive methods were employed at the docks and in warehouses, &c. A small localised outbreak of typhus fever occurred in the latter half of the year, the infection probably having been introduced from Ireland by means of lice-infected material. There were 37 cases and 6 deaths. The number of enteric fever cases was 136, 21 of which had a fatal termination. Only 3049 cases of measles were reported, as compared with 6426 in the previous year. These figures do not, however, represent the total number of measles cases occurring in the city, but have reference, for the most part, to those coming to the notice of the school authorities. The deaths from this disease numbered 256, as against 517 in 1914. The deaths from whooping-cough numbered 259, showing a slight increase over the preceding year, when there were 248. There were 2866 deaths among infants under one year, giving an infantile mortality rate of 133 per 1000 births. Much is being done to lessen the infantile mortality in Liverpool. As many as 95 per cent. of all births notified under the Notification of Births Act, 1907, have been visited by the health visitors during the year.

*City of Cork.*—There are some interesting items of information in Mr. Denis D. Donovan's annual report for the year 1915. The reduction in the number of cases of typhus fever in the city is well illustrated by the following figures. During the ten years 1879-88 there were 4836 cases; during the next decade 1889-98 there were 547 cases; and during the decade 1899-1908 there were 122 cases, whilst 18 cases were notified in 1909, 8 in 1910, 10 in 1911, 1 in 1912, 5 in 1913, 1 in 1914, and none in 1915. In this connexion Mr. Donovan states:—

In my annual report for 1886 I pointed out that the opening of new areas in the congested districts, and the building of cottages for the working class population would have a decided effect in the reduction of typhus fever. This statement is now more than borne out by facts. There has also been a considerable reduction in the number of enteric fever cases. In the ten years 1879-88, 793 cases of this disease occurred; in the following decade, 1889-98 there were 879 cases; while during the ten years 1899-1908 there were only 512 cases. The number of cases notified in 1909 was 74; in 1910, 54; in 1911, 32; in 1912, 26; in 1913, 29; in 1914, 50; and in 1915, 32. In commenting on the prevalence of enteric fever the medical officer of health informs us that some years ago a number of shallow wells were in existence in different parts of the city. As the water in these wells was found to be polluted, they were closed. Up to the year 1889 the main sewers were not ventilated; since this was done the disease has materially diminished. An effort is also being made to remedy the faulty old house drains and bad connexions that are to be met with all over the city. Mr. Donovan expresses the view that if the periodical flooding that occurs from time

to time in the central flat portion of the city could be dealt with and the subsoil properly drained there would be less typhoid fever than at present. The birth-rate of Cork for the year under review is 23·18 per 1000 of the population and the infant mortality-rate 132 per 1000 births. By the passing of the Notification of Births (Extension) Act, 1915, the Notification of Births Act, 1907, came into force in the city on Sept. 1st. Under the provisions of the Infectious Disease (Notification) Act, 1889, epidemic diarrhoea has been made compulsorily notifiable. A "lady sanitary sub-officer," who is qualified to give the necessary advice and instruction to mothers regarding their own health and the care and proper feeding and clothing of their infants, has for some time been on the staff of the health department. It is hoped that, through her exertions, the number of deaths of infants will be somewhat reduced. The statement appears in this annual report that the city of Cork is in the unenviable position of having the highest consumptive death-rate of any town in Great Britain and Ireland. There were 211 deaths from this disease in 1915, or about one-eighth of the total number of deaths registered during the year. The death-rate from the malady was 2·88 per 1000. A system of voluntary notification, to which we have recently called attention, was introduced in 1907, but apparently it has proved to be of little value, and Mr. Donovan urges his council to adopt obligatory notification.

### ANNUAL REPORTS FROM INDIA.

*The Health of Bombay in 1915.*—The population of Bombay in 1911 amounted to 979,445. The total death-rate in 1915 was 24·17 per 1000, comparing most favourably with the ratio of 35 per 1000 for the preceding quinquennium 1910-1914; the ratio is, indeed, lower than in any year since 1874, when it was 24·04 per 1000. The male death-rate was 20·33, and that for females 31·43 per 1000. It is stated by Dr. J. A. Turner, the health officer to the municipality, that "this inequality of rates of mortality among males and females is largely to be accounted for by the preponderance of males, who form nearly two-thirds of the population." About two-thirds of the inhabitants are Hindus of various castes, with an average mortality ratio of 22·77; the Mussulmans have a ratio of 30·89, while for Parsees the ratio is only 18·82 and for Europeans 13·62. The infantile mortality, 329·2 per 1000 births, is much lower than in the previous year (385·1); among Hindus the ratio was 350 and among Parsees 153 per 1000. Much has been done by means of lady health visitors, midwives, a maternity home, and the provision of milk, bed and blanket for such mothers as cannot go to the home, but all this only touches the fringe of the problem, since about 76 per cent. of the population live in one-room tenements. In Bombay, as in Calcutta, much has been done to ameliorate the conditions affecting child-birth, ten trained midwives having been appointed under Lady Willingdon's scheme to act as health visitors and induce prospective mothers to enter the municipal maternity home. A similar home at Parel and one at Colaba will before long be established. As regards epidemic diseases, the incidence was lower in 1915 than in the previous year, and in the decennium, in every case except small-pox, for which the death-rate was 0·36, compared with 0·25 in 1914 and 0·72 in the decennium (1905-1914). The most notable feature during the year was the reduction of plague to the smallest proportions on record; there were 599 deaths, giving a death-rate of 0·61 per 1000. In 1914 the ratio was 3·00, and for the decennium (1905-1914) it averaged 5·93 per 1000. The usual preventive measures—inoculation, rat destruction, evacuation and disinfection—were carried out. Small-pox prevailed to some extent, there having been 775 attacks compared with 252 in the previous year. Tuberculosis continues to decline rapidly; in 1900 the mortality ratio was 10·53 per 1000; in 1905 it was 4·10, and in 1915 only 1·74 per 1000. Lastly, the ratio for fevers (1·74 deaths per 1000) was less than in any previous year or period for which statistics are available; of the total deaths from this cause (2091), all were from malaria except 109, which were due to enteric fever. Much work is being done in regard to the control of tuberculosis; the King George V. Antituberculosis League was started, an executive committee formed, a dispensary and hospital accommodation for 25 patients were provided. Various measures have also been undertaken for improving the general sanitary condition of a particular area found to have a high tuberculous death-rate. Enteric fever has shown an apparent increase during recent

years, but it is probable that this is due to increased care in diagnosis. Dr. Turner's report on the health of Bombay is extremely interesting, and is illustrated by numerous tables and a map.

*The Health of Calcutta in 1915.*—The report of Dr. H. M. Crake for 1915 shows the enormous difficulties that have to be contended with in maintaining anything approaching satisfactory sanitation under the existing conditions of climate and overcrowding. Dr. Crake has calculated the ratios throughout on a population of 896,097, as ascertained by census in 1911, rather than on any hypothetically increased number of inhabitants present in 1915, and shows that any estimate of the latter must be of doubtful accuracy. The total death-rate was 28·5 per 1000, practically the same as the quinquennial average (28·6). As always, the mortality among females (37·8) largely exceeded that among males (24·1), due to the strict *purdah* system under most insanitary conditions. The highest female death-rate was 51 per 1000, in Kidderpore Ward, where the male rate was also highest, 48·1 per 1000. In Burra Bazar the female death-rate was 32·6, and the male rate only 15 per 1000; many other districts present a similar excessive female mortality. Approximately half the inhabitants of Calcutta are Hindus, with a death-rate of 29·2; that for Mahomedans being 28·0 and for Christians 25·9 per 1000. The infantile mortality (287·6) was higher than in any of the four years preceding, due especially to debility at birth, tetanus, and bronchitis. Tetanus is, of course, due to dirty midwifery, for we learn that "there has never been a single case amongst the hundreds of babies brought into the world by the corporation midwives." It is hoped that before long "baby clinics" will be established. A severe epidemic of small-pox, lasting seven months, resulted in 2560 deaths; as nearly half the deaths occurred among infants and young children under 5 years it is evident that large numbers escaped vaccination. Among the satisfactory signs of progress the extension and acceptance of vaccination is most encouraging. The total number vaccinated, 100,720, constitutes a record. The majority (77,518) were revaccinations, being about ten times the average of a non-epidemic year. The percentage of success was 39·4. Plague as an epidemic has practically disappeared, there having been only 191 deaths. There was, however, heavy rat mortality, mostly in the first three months of the year. Tuberculosis caused 1920 deaths (2·1 per 1000), the lowest record during five years. The female mortality (3·18) was double that of the male (1·6). Cholera caused 1612 deaths (1·8 per 1000), the smallest number recorded during the last 16 years. In Kidderpore Ward the ratio was 3·7 per 1000, infection being undoubtedly conveyed through contaminated water at the bathing-places. Malaria caused 1258 deaths (1·4 per 1000), and was more fatal than usual in certain wards lying east of Upper Circular-road. As the sewerage system becomes extended and the area more thoroughly drained there will certainly be a decided improvement. Anti-mosquito measures were carried out most energetically in certain wards principally affected by malaria, tanks breeding anopheles being treated three times a month. The commonest forms found in the suburban areas were *Anopheles rossii* (50 per cent.), *nigerinus*, and *barbirostris*. In view of the opening of the Panama Canal a plan of operations has been worked out for dealing with the stegomyia problem. The most urgent matter at present is stated to be the control of stegomyia in the Fort area, where there appears to be an absence of an adequate general sanitary organisation. Observations were made on the effects of storage of the Hugli river water, in comparison with sand filtration; in the settling tanks lactose-fermenting bacteria were generally found in 5 c.c., but rarely in 1 c.c., while in the filtered water they were generally absent in 10 c.c. The report is accompanied by numerous diagrams, tables, and a map.

#### URBAN VITAL STATISTICS.

(Week ended Jan. 6th, 1917).

*English and Welsh Towns.*—In the 96 English and Welsh towns, having an aggregate population estimated at nearly 18,000,000 persons, the annual rate of mortality during the week was equal to 18·9 per 1000 of the population, against 23·7 and 21·9 per 1000 in the two preceding weeks. Among the several towns the death-rate ranged from 8·9 in Rotherham, 10·6 in Cambridge, and 11·9 in Gloucester, to 27·7 in Oxford, 29·6 in Bath, and 35·4 in Bournemouth. The annual rate in London, with a population of more than 4,000,000, was equal to 19·6, or 4·1 per 1000 less than that recorded in the previous week. In the 96 towns, the principal epidemic diseases caused 207 deaths,

which corresponded to a rate of 0·6 per 1000, and included 64 from infantile diarrhoea, 61 from measles, 50 from diphtheria, 17 from whooping-cough, 8 from scarlet fever, and 7 from enteric fever. The deaths from each of these diseases were below the average in the four preceding weeks. The deaths from diphtheria included 11 in London, 5 in Birmingham, and 3 in Derby. The number of scarlet fever patients under treatment in the Metropolitan Asylums Hospitals and in the London Fever Hospitals had further declined at the end of the week to 869; and the cases of diphtheria had also declined to 1431. Of the 6270 deaths from all causes in the 96 towns, 216 resulted from violence. The causes of 68 of the total deaths were uncertified, of which 15 were registered in Birmingham, 11 in Liverpool, and 4 in St. Helens.

*Scotch Towns.*—The deaths registered in Glasgow numbered 397, and were equal to an annual rate of 18·6, against 19·6 per 1000 in London, and included 7 from infantile diarrhoea, 4 from whooping-cough, 2 from diphtheria, and one each from measles and scarlet fever. Of the 397 deaths, 77 were of infants under 1 year and 92 of persons aged 65 years and upwards. The 117 deaths from all causes in Edinburgh corresponded to an annual rate of 18·4 per 1000, and included 7 of infants under one year and 44 of persons aged 65 years and upwards. Four deaths were referred to diphtheria, and one each to whooping cough and infantile diarrhoea.

*Irish Towns.*—The 202 deaths registered in Dublin during the week were equal to an annual rate of 26·4 per 1000, and included 4 from infantile diarrhoea, 2 from measles, and 1 from enteric fever. The causes of 9 deaths were uncertified. The 145 deaths in Belfast corresponded to an annual rate of 19·2, against 21·3 per 1000 in the previous week. These deaths included 2 from infantile diarrhoea and 1 each from measles and diphtheria. The causes of 5 of the total deaths were uncertified.

(Week ended Jan. 13th, 1917.)

*English and Welsh Towns.*—In the 96 English and Welsh towns having an aggregate population estimated at nearly 18,000,000 persons, the annual rate of mortality during the week was equal to 16·8 per 1000 of the population, against rates declining from 23·7 to 18·9 per 1000 in the three preceding weeks. Among the several towns the death-rate ranged from 6·6 in West Hartlepool, 8·0 in Grimsby, and 10·0 in Easbourne, to 22·6 in St. Helens, 24·8 in Bury, and 27·0 in Hastings. The annual rate in London, with a population of more than 4,000,000, was equal to 17·6, or 2·0 per 1000 below that recorded in the previous week. In the 96 towns the principal epidemic diseases caused 210 deaths, corresponding to a rate of 0·6 per 1000, and included 67 from infantile diarrhoea, 57 from measles, 45 from diphtheria, 25 from whooping-cough, 10 from enteric fever, and 6 from scarlet fever. The deaths from enteric fever and whooping-cough exceeded, while those from the remaining diseases were below, the average in the three preceding weeks. Measles caused a death-rate of 3·7 in Wimbledon; of the 46 deaths referred to diphtheria, 9 occurred in London, and 4 each in Birmingham and Liverpool. The number of scarlet fever and diphtheria patients in the Metropolitan Asylums Hospitals and the London Fever Hospitals had further declined to 829 and 1395 respectively by the end of the week. Of the 5594 deaths from all causes in the 96 towns, 193 resulted from violence. The causes of 46 of the total deaths were uncertified, and included 10 in Liverpool, 8 in Birmingham, and 5 in Gateshead.

*Scotch Towns.*—The 388 deaths recorded in Glasgow corresponded to an annual rate of 18·1, against 17·6 per 1000 in London, and included 9 from whooping-cough, 5 from infantile diarrhoea, 3 from diphtheria, 2 from measles, and 1 from enteric fever. Of the 388 deaths, 59 were of infants under 1 year and 110 of persons aged 65 years and upwards. In Edinburgh the 114 deaths were equal to a rate of 17·9, or 0·5 per 1000 below that in the previous week, and included 3 from diphtheria and 1 from whooping-cough.

*Irish Towns.*—The 161 deaths registered in Dublin were equal to an annual rate of 21·0 per 1000, and included 3 from measles and 1 from infantile diarrhoea. The causes of 12 deaths were uncertified. The 155 deaths in Belfast corresponded to a rate of 20·6, or 1·4 per 1000 above that in the previous week, and included 4 from infantile diarrhoea and 1 each from whooping-cough and diphtheria.

#### VITAL STATISTICS OF LONDON DURING DECEMBER, 1916.

In the accompanying table will be found summarised complete statistics relating to sickness and mortality in the City of London and in each of the metropolitan boroughs. With regard to the notified cases of infectious diseases, it appears that the number of persons reported to be suffering from one or other of the ten diseases specified in the table was equal to an annual rate of 3·9 per 1000 of the population, estimated at 4,310,030 persons in the middle of the year; in the three preceding months the rates were 4·9, 5·4, and 5·0 per 1000. The lowest rates last month were recorded in the City of Westminster, Hampstead, Stoke Newington, the City of London, and Wandsworth; and the highest rates in Holborn, Bethnal Green, Stepney, Deptford, and Greenwich. The prevalence of scarlet fever showed a marked decline from that recorded in the preceding month; this disease was proportionally most prevalent last month in Paddington, Kensington, Fulham, Bethnal Green, Bermondsey, and Lewisham. There were 913 scarlet fever patients under treatment in the Metropolitan Asylums Hospitals at the end of last month, against 1117 and 1066 at the end of the two preceding months; the weekly admissions averaged 95, against 160 and 131 in the two preceding months. Diphtheria also was much less prevalent than it had been in other recent months; the greatest proportional prevalence of this disease was recorded in Holborn, Bethnal Green, Stepney, Southwark, Deptford, and Greenwich. The number of diphtheria patients under treatment in the Metropolitan Asylums Hospitals, which had been 1479 and 1543 at the end of the two preceding months, had declined again to 1479 at the end of last month; the weekly admissions averaged 143, against 209 and 187 in the two preceding months. The prevalence of enteric fever was considerably less than in either of the two preceding months; of the 23 cases notified during the month, 4 belonged to Islington, 4 to Wandsworth, 3 to Camberwell, and 2 to Paddington. The Metropolitan Asylums Hospitals contained 37 enteric fever patients at the end of last month, against 39 and 42 at the end of the two preceding months; the weekly admissions averaged 5, against 7 in each of the three preceding months. Kyselipas was proportionally most prevalent last month in Paddington, Holborn, Bethnal Green, Poplar, Deptford, and Greenwich. The 29 cases of puerperal fever included 4 in Camberwell, 3 in Fulham, 3 in

Wandsworth, and 2 each in Kensington, Islington, Stepney, Poplar, Bermondsey, and Woolwich. Of the 24 cases of cerebro-spinal meningitis, 4 belonged to Islington, 4 to Finsbury, 3 to Lambeth, 2 to Stepney, and 2 to Woolwich; while the 5 cases of poliomyelitis belonged respectively to Hammersmith, Stepney, Bermondsey, Lambeth, and Lewisham.

The mortality statistics in the table relate to the deaths of persons actually belonging to the several metropolitan boroughs, the deaths occurring in institutions having been distributed among the boroughs in which the deceased persons had previously resided. During the four weeks ended Dec. 30th the deaths of 7475 London residents were registered, equal to an annual rate of 22.6 per 1000 of the population; in the three preceding months the rates were 12.0, 12.0, and 14.5 per 1000 respectively. The death-rates last month ranged from 14.7 in the City of London, 18.3 in Lewisham, 18.8 in Hamps ead, 19.0 in Wandsworth, 19.4 in Hackney, and 19.6 in Stepney, to 25.9 in Southwark, 26.4 in Kensington, 26.7 in Shoreditch, 26.9 in St. Marylebone, 28.8 in Finsbury, and 29.0 in Chel-sea. The 7475 deaths from all causes included 271 which were referred to the principal infectious diseases; of these, 99 resulted from measles, 5 from scarlet fever, 49 from diphtheria, 15 from whooping-cough, 3 from enteric fever, and 100 from diarrhoea and enteritis among children under two years of age. No death from any of these diseases was recorded last month in the City of London; among the metropolitan boroughs they caused the lowest death-rates.

in Kensington, Hampstead, Holborn, and Wandsworth, and the highest rates in Chelsea, Shoreditch, Bethnal Green, Poplar, Bermondsey, Greenwich, and Woolwich. The 99 fatal cases of measles were 16 fewer than the corrected average number in the corresponding period of the five preceding years; this disease was proportionally most fatal last month in Bethnal Green, Poplar, Southwark, Bermondsey, Greenwich, and Woolwich. The 5 deaths from scarlet fever were 14 below the corrected average number, and included one each in St. Marylebone, Stoke Newington, Southwark, Lambeth, and Camberwell. The 49 fatal cases of diphtheria showed a decline of 6 from the corrected average number; the greatest proportional mortality from this disease was recorded last month in Chelsea, Bethnal Green, Stepney, and Camberwell. The 15 deaths from whooping-cough were only one-third of the corrected average number, and included 3 in Shoreditch, 3 in Lambeth, and 2 in Hackney. The deaths from enteric fever, which had averaged 10 in the last four weeks of the five years 1911-15, fell last month to 3, of which 2 belonged to the City of Westminster and 1 to Greenwich. The 100 deaths from diarrhoea and enteritis among children under 2 years of age were 15 above the average; the greatest proportional mortality from this cause was recorded in Hammersmith, Fulham, Chelsea, Islington, Shoreditch, Bethnal Green, and Bermondsey. In conclusion it may be stated that the aggregate mortality in London last month from the principal infectious diseases was 17.6 per cent. below the average.

#### ANALYSIS OF SICKNESS AND MORTALITY STATISTICS IN LONDON DURING DECEMBER, 1916.

(Specially compiled for THE LANCET.)

CITIES AND BOROUGHS.	Estimated civil population, 1916.	Notified Cases of Infectious Disease.										Deaths from Principal Infectious Diseases.												
		Small-pox.	Scarlet fever.	Diphtheria.*	Typhus fever.	Enteric fever.	Other continuous fevers.	Puerperal fever.	Erysipelas.	Cerebro-spinal meningitis.	Poliomyelitis.	Total.	Annual rate per 1000 persons living.	Measles.	Scarlet fever.	Diphtheria.*	Whooping-cough.	Enteric fever.	Diarrhoea and enteritis (under 2 years).	Total.	Annual rate per 1000 persons living.	Deaths from all causes.	Death-rate per 1000 living.	
LONDON... . .	4,310,030	—	406	569	—	23	—	29	217	24	5	1273	3.9	—	99	5	49	15	3	100	271	0.8	7475	22.6
West Districts :																								
Paddington ... .	131,397	—	20	6	—	2	—	—	14	—	—	42	4.2	—	—	—	—	—	—	4	4	0.4	234	23.2
Kensington ... .	155,795	—	20	10	—	1	—	2	4	—	—	37	3.1	—	—	—	—	—	3	4	0.3	316	26.4	
Hammersmith ... .	118,559	—	7	16	—	—	—	1	2	—	1	27	3.0	—	—	—	1	—	—	6	6	0.7	199	21.9
Fulham ... .	151,161	—	20	17	—	—	—	3	4	1	—	45	3.9	—	—	—	2	—	6	6	0.5	244	21.0	
Chelsea ... .	58,421	—	6	10	—	1	—	—	4	1	—	20	4.5	—	—	—	2	—	3	6	1.3	130	29.0	
City of Westminster	135,104	—	6	15	—	1	—	—	4	1	—	27	2.6	—	4	—	—	2	—	2	10	1.0	234	22.6
North Districts :																								
St. Marylebone ... .	100,260	—	7	8	—	—	—	—	6	1	—	22	2.9	—	—	1	—	—	2	3	0.4	207	26.9	
Hampstead ... .	81,760	—	6	5	—	—	—	—	2	—	—	13	2.1	—	—	1	—	2	2	0.3	118	18.8		
St. Pancras ... .	200,322	—	17	27	—	1	—	1	11	—	—	57	3.7	—	7	—	1	—	5	15	1.0	394	25.6	
Islington ... .	316,242	—	37	32	—	4	—	2	9	4	—	88	3.6	—	1	—	1	—	15	17	0.7	583	24.0	
Stoke Newington...	50,527	—	2	3	—	—	—	1	8	—	—	53	1.3	—	—	2	—	4	1	0.3	89	23.0		
Hackney ... .	217,883	—	23	20	—	1	—	1	8	—	—	53	3.2	—	1	—	2	—	7	7	0.4	325	19.4	
Central Districts :																								
Holborn ... .	40,405	—	3	9	—	—	—	—	5	—	—	17	5.5	—	—	—	—	—	1	1	0.3	79	25.5	
Finsbury ... .	76,915	—	6	13	—	—	—	—	1	2	4	26	4.4	—	—	1	—	1	5	0.8	170	28.8		
City of London ... .	19,461	—	2	—	—	—	—	—	—	—	—	2	1.3	—	—	—	—	—	—	—	—	22	14.7	
East Districts :																								
Shoreditch ... .	103,627	—	9	14	—	1	—	—	7	1	—	32	4.0	—	—	2	—	3	5	1.3	212	26.7		
Bethnal Green ... .	120,207	—	16	33	—	1	—	1	19	1	—	71	7.7	—	6	—	4	—	1	15	1.6	199	21.6	
Stepney ... .	265,731	—	31	54	—	1	—	2	20	2	1	111	5.4	—	4	—	7	—	1	12	0.6	400	19.6	
Poplar ... .	166,247	—	11	22	—	—	—	—	14	—	—	49	4.1	—	9	—	3	—	5	17	1.4	257	21.4	
South Districts :																								
Southwark ... .	179,424	—	7	39	—	—	—	—	11	1	—	58	4.2	—	9	1	3	—	2	15	1.1	357	25.9	
Bermondsey ... .	117,138	—	22	10	—	—	—	—	2	7	1	43	4.8	—	14	—	1	—	5	20	2.2	221	24.6	
Lambeth ... .	284,188	—	27	30	—	1	—	1	11	3	1	74	3.4	—	7	1	3	3	7	21	1.0	502	23.0	
Battersea ... .	161,945	—	16	25	—	—	—	1	5	1	—	48	3.9	—	3	—	2	—	8	8	0.6	255	20.5	
Wandsworth ... .	312,249	—	21	23	—	4	—	3	7	1	—	59	2.5	—	3	—	2	—	8	8	0.3	455	19.0	
Camberwell ... .	254,355	—	21	35	—	3	—	4	9	—	—	72	3.7	—	4	1	—	3	8	20	1.0	441	22.6	
Deptford ... .	110,299	—	8	26	—	1	—	—	13	—	—	48	5.7	—	2	—	2	—	4	4	0.5	207	24.5	
Greenwich ... .	96,355	—	4	30	—	—	—	2	5	—	1	43	5.8	—	12	—	1	—	1	15	2.0	180	24.3	
Lewisham ... .	164,438	—	22	16	—	—	—	2	5	—	1	44	3.5	—	12	—	2	—	1	2	0.5	231	18.3	
Woolwich... .	129,505	—	9	21	—	—	—	—	5	2	—	39	5.9	—	12	—	1	—	1	13	1.3	214	21.5	
Port of London ... .	—	—	—	—	1	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	

\* Including membranous croup.

## THE SERVICES.

### ROYAL NAVAL MEDICAL SERVICE.

To be Temporary Surgeon : H. F. Seymour.

The following appointments have been notified:—Fleet-Surgeons: R. M. Richards and E. B. Pickthorne to the *Victory*; G. M. Eastman to the *Kent*. Staff Surgeons: R. H. St. B. E. Hughes to the *Pembroke* and A. H. Richardson to the *Research*. Surgeons: E. C. Holtom and F. J. R. Cowie to the *Pembroke*. Temporary Surgeons: N. N. Wade to Haslar Hospital; R. M. Barrow to *Swiftsure*; W. H. Sarra to *Cesar*; J. E. Scanlan to *Cochrane*; G. C. Mort to *Pomone*, additional, for Dartmouth College; M. Prior to *Vivid*, additional, for disposal; and H. W. Cooke to *Vivid*, additional, for Plymouth Hospital.

### ARMY MEDICAL SERVICE.

Lieut.-Col. R. Caldwell, from R.A.M.C., to be Colonel, and to be supernumerary.

Temp. Lieut.-Cols. R. Jones and H. G. Barling (Majors, R.A.M.C., T.F.) to be temporary Colonels.

### ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonels to be acting Colonels whilst employed as Assistant Directors of Medical Services of a Division: H. M. Morton, H. Hewston, W. E. Hudleston.

The undermentioned relinquish the rank of temporary Lieutenant-Colonels on reposing: Bt. Lieut.-Col. FitzG. G. Fitzgerald, Major M. F. Grant, Major A. R. C. Parsons.

Temp. Lieut.-Col. R. J. R. C. Simons (Major R.A.M.C., T.F.) relinquishes his temporary rank.

Captains (acting Lieutenant-Colonels) relinquishing their acting rank on reposing: A. S. Williams D.S.O., A. R. Wright.

Majors to be temporary Lieutenant-Colonels whilst in command of a Casualty Clearing Station: J. M. B. Rahilly, J. G. Bell, D.S.O.

Major W. J. P. Adye-Curran to be temporary Lieutenant-Colonel whilst in command of a General Hospital.

Major R. T. Collins to be temporary Lieutenant-Colonel whilst in command of a Field Ambulance.

Major G. S. Mansfield to be temporary Lieutenant-Colonel while employed as an Assistant Director of Medical Services, Home Forces.

Major W. J. Waters to be acting Lieutenant-Colonel whilst in command of a General Hospital.

Captains (acting Majors) to be acting Lieutenant-Colonels whilst in command of a Field Ambulance: W. I. Thompson, F. Worthington, D.S.O., G. H. Dive, A. S. Littlejohns, A. S. Williams, D.S.O., B. M. O'Neill, D.S.O., J. J. O'Keeffe, A. R. Wright, A. D. Fraser, W. G. Wright, A. G. Wells, T. B. Nicholls, T. T. H. Robinson, F. H. Bradley, J. D. Bowie, F. L. Bradish, T. S. Eves, E. C. Phelan, W. H. Forsyth, E. J. Kavanagh, W. K. Beaman, H. Gibson.

Captains to be acting Lieutenant-Colonels whilst in command of a Field Ambulance: W. B. Burdon, E. D. Caddell, D. F. Mackenzie, G. B. Edwards, C. R. M. Morris, R. Hemphill, W. Egan, C. W. Bowle, J. du P. Langrishe.

Temporary Captains (acting Majors) to be acting Lieutenant-Colonels whilst in command of a Field Ambulance: J. R. C. Greenlees, D.S.O., H. Faulkner.

Temporary Capt. J. la F. Lauder, D.S.O., to be acting Lieutenant-Colonel whilst in command of a Field Ambulance.

Capt. W. I. Thompson to be temporary Major whilst in command of a Field Ambulance.

Temporary Captains to be temporary Majors: N. H. Mummary, F. C. Hart-Smith, J. R. Lee.

F. A. G. Jeans to be temporary Honorary Major while employed with No. 6 British Red Cross Hospital (Liverpool Merchants' Mobile).

Temporary Lieutenants to be temporary Captains: J. L. Whatley, G. A. Hayman, T. Forsyth, C. Witts, C. G. Lambie, A. S. Sieger, W. D. Cruckshank, J. P. MacDonald, F. W. Rigby, J. H. Crofton, W. E. Hills, W. Parker, T. W. B. Morton, H. C. W. Allott, A. W. Allen, J. Welsh, D. Kennedy, W. Darlington, O. V. Burrows, J. Appleyard, J. T. O'Boyle, G. A. MacFarland, C. D. Holdsworth, J. G. Craig, C. F. Rumsey, H. J. Nightingale, H. G. Smith, L. Fraser, W. Duffy, T. H. Twigg, L. D. I. Graham, T. L. Price, D. M. Clements, H. M. Vickers, H. Goodman, D. M. Moffatt, W. H. Blakemore, W. Hamilton, F. M. Murray, G. Thomson, L. Levene, P. E. Barrow, P. A. B. Clark, M. Chadwick, D. W. Daniels, J. S. Dunn, G. C. Linder, R. A. Johnston, J. McIntyre, F. L. Hill, W. A. R. Michell, J. H. Egbert, W. G. Macdonald, R. S. Dollard, H. E. Bloxsome, S. A. D'Arcy, F. Hannigan, O. Carlyle, W. C. Menzies, H. H. Fisk, D. H. Berry, C. S. Vartan, J. K. Davies, W. Wilson, F. M. Byrne, J. Smith, R. Proctor, G. S. Clancy, G. T. Baker, J. B. MacKay, C. A. Dupont, J. C. A. Ridgway, H. G. Baynes, H. C. Watson, J. D. Robertson, H. F. Sheldon, J. W. Weaver.

Lieut. A. R. Wrightman, from 3rd Northern General Hospital (T.F.), to be temporary Lieutenant.

To be Lieutenants and granted the rank of temporary Captain: Temp. Captains: G. D. Jamieson, D. W. Palithorpe, St. J. D. Buxton, S. Arnott, T. L. Fraser, L. G. Bourdillon, G. A. Lilly, J. Sainsbury, G. D. Robertson, H. D. F. Brand, J. P. Little, C. J. O'Reilly, D. C. Monro, W. Foot, F. C. K. Austin, G. A. E. Argo, S. S. Crosse, R. W. Galloway, G. D. Harding, J. A. Andrews, H. J. Couchman, R. C. Robertson, W. A. Sneath, A. L. Aymer, A. N. Minns, D. Pottinger, D. Bell, D. G. Cheyne, P. A. Opie, A. S. Taylor, H. C. Godding, D. W. Beamish, W. L. E. Reynolds, H. A. Rowell, O. B. Pratt, J. H. Boag, C. R. Dudgeon, H. E. A. Boldero, R. C. Matson, H. R. Sheppard, R. L. Ritchie, E. S. Cuthbert, J. La F. Launder, D.S.O., T. H. Sarsfield, J. F. Bourke, H. J. Bower, A. F. G. Guinness, Captain from R.A.M.C. (T.F.): R. E. Barnsley. Captains from R.A.M.C. (Special Reserve): E. Davies, T. J. Kelly, R. J. Clausen, C. McN. McCormack, E. F. W. Grellier, O. Hairsine, A. B. Preston, R. Ellis, F. G. A. Smyth, J. C. A. Dowse, C. O. Shackleton, F. P. Freeman, A. M. McCutcheon, H. H. Mulholland, A. C. Jebb, E. B. Marsh, C. W. Treherne, J. H. Pendered, W. W. MacNaught, J. P. Little, H. A. Harbison, W. G. Shakespear, A. L. Robb, E. Catford, A. F. J. Patterson, C. J. D. May, T. P. Rankin, W. C. Hartgill, T. F. Kennedy, K. A. M. Tomory, J. S. Sloper, C. Wilson, H. N. Stafford, R. I. Sullivan, R. A. Anderson, F. M. Lipacomb, H. P. Rudolf, D. N. Macleod, G. B. Hadden, R. P. Cormack, G. S. Pirie, W. K. Campbell, G. H. Haines, R. B. Myles, R. R. Thompson, A. E. Richmond, E. Jamieson, J. E. Brooks, W. H. A. D. Sutton, G. T. Gimeléte, W. L. A. Harrison, F. R. S. Shaw, R. Stowers, O. D. Jarvis, J. A. Binning.

H. P. Thompson to be temporary Honorary Lieutenant.

Temp. Major John M. Atkinson relinquishes his commission on account of ill-health.

Temporary Captains relinquishing their commissions: F. A. R. Hacker, A. Dingwall Fordyce, G. Norman, G. A. Finlayson, G. W. Thompson, N. D. Bardsell, J. R. H. Walker, E. J. Stubbs, R. R. Forbes, J. R. Dobbin, J. A. Gentle (on account of ill-health).

Temp. Hon. Capt. W. Gennell, H. Bowring, J. Beckett, and W. D. Copplestone relinquish their commissions.

Temporary Lieutenants relinquishing their commissions: J. C. Forbes, A. W. Brodrrib, L. W. May, T. F. Wilson, C. J. R. Joyce, J. J. McMillan, C. K. Stevenson, J. McDonald, E. Rommel, R. J. Bethune, N. H. Austin, J. F. MacLeod, M. G. Pettigrew, J. Bowen-Jones, J. A. K. Griffiths, C. H. G. Ross, G. Stowell, C. H. Ferguson, C. H. Phillips, J. Pender, T. H. Clarke, H. L. Askham, A. Barrett, H. P. Thompson, S. D. Bridge, A. O. Evans, J. G. Bell, F. M. Bishop, R. A. McNeill, R. T. Slinger, W. H. Broughton, A. E. Clark, H. A. Watney, G. R. Potter, J. C. Mead, J. M. Hermon, W. J. McL. Baird, W. H. Hodgson, H. M. Mills, J. W. Hilliard, T. A. Mayo, G. Kee, N. Navarra, H. Harrison, H. F. Johns, W. Bligh, H. W. M. Strover, P. Stocks, W. J. Asby, V. Colmer, H. E. Brown, P. A. Nightingale, A. T. Thompson, J. D. Stewart, C. J. Pentland.

#### SPECIAL RESERVE OF OFFICERS.

Captains (acting Majors) to be acting Lieutenant-Colonels whilst in command of a Field Ambulance: M. R. Taylor, D. C. Barron, K. D. Murchison.

Capt. A. H. Habgood to be acting Lieutenant-Colonel whilst in command of a Field Ambulance.

Lieutenants to be Captains: J. Cullenan, C. O. J. Young, N. A. Martin.

To be Lieutenants: F. K. Hayman, from Bristol Contingent, O.T.C.; T. Stanton, from Dublin University Contingent, O.T.C.; G. E. Archer, from University of Manchester Contingent, O.T.C.; W. Burridge.

#### TERRITORIAL FORCE.

Lieut.-Col. H. G. Barling is now seconded whilst holding a temporary commission in the Army Medical Service.

Major (Temp. Lieut.-Col.) G. M. Hetherington relinquishes his commission on account of ill-health.

Major A. N. Davis resigns his commission on account of ill-health, and is granted the honorary rank of Major.

Capt. H. Beeney relinquishes his commission on account of ill-health, contracted on active service, and is granted the honorary rank of Captain.

Capt. F. C. Bentz relinquishes his commission on account of ill-health caused by wounds, and is granted the honorary rank of Captain.

Lieutenants to be Captains: N. R. Williamson, A. J. A. McCabe-Dallas, A. M. Jones, T. B. McKee, S. K. McKee.

Attached to Units other than Medical Units.—Lieut. J. A. Hartley to be Captain. Major J. F. Crombie to be temporary Lieutenant-Colonel whilst commanding a Field Ambulance.

#### INDIAN MEDICAL SERVICE.

Lieutenant-Colonel to be Colonel: W. E. Jennings.

Lieutenant-Colonels to be temporary Colonels: G. B. Irvine, C. N. C. Kimberley.

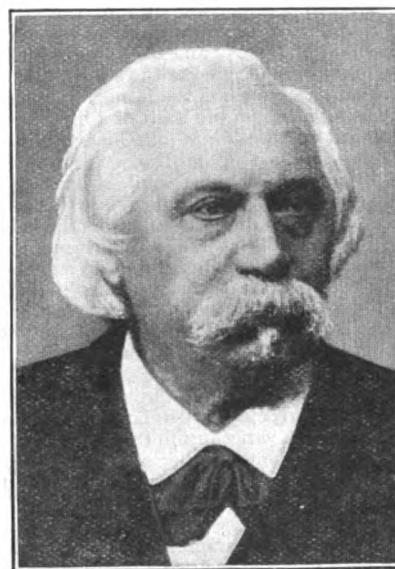
To be Lieutenants: I. D. Grant, A. H. Brown, E. Cotter, H. E. Murray.

## Obituary.

### JEAN BAPTISTE AUGUSTE CHAUVEAU.

Auguste Chauveau, whose death in his ninetieth year we recorded last week, had outlived all his famous co-workers of earlier years. E. J. Marey had long predeceased him, while Charles Bouchard, his coadjutor in founding the *Journal de Physiologie et de Pathologie Générale*, died in October, 1915. Associated thus in the direction of an influential journal, the spheres of activity of Bouchard and Chauveau were yet widely different: the former was an eminent and well-beloved physician, the latter will be remembered as a many-sided biologist and one of the makers and masters of physiology during the latter half of last century. He was also a great comparative pathologist, doing pioneer work on various contagions, including tuberculosis, which had an intimate bearing on practical and preventive medicine. His energies, however, were not confined to this borderland between pathology and medicine, for he became a fine exponent of veterinary medicine.

Auguste Chauveau was born at Villeneuve-le-Guyard (Yonne) on Nov. 23rd, 1827, and, like many other provincials, gravitated to Paris, where he studied at Alfort—



AUGUSTE CHAUVEAU.

the great veterinary school just outside Paris—and also in the Faculty of Medicine of Paris, as well as at the Veterinary School of Lyons. He was elected on the staff of the Lyons Veterinary School at the age of 21, and ultimately its director in 1875. His wide knowledge of the subject led to his appointment as inspector-general of the Veterinary Services in France. Later on his keen interest in the advancement of physiology and pathology found a new and wider sphere on his appointment as professor of comparative pathology at the Natural History Museum in Paris, where he built an entirely new institute fitted for the study of comparative physiology and pathology. In Paris Chauveau took an active interest in all that went on in the medical societies. He was a member of the Institute at the Academy of Sciences, where he sat not as a physiologist but in the agricultural economy section, just as Pasteur did not sit as a chemist but as a representative of mineralogy. He was also a member and regular attendant at the Academy of Medicine, as well as at the Society of Biology, of which he was at one time president. At these gatherings his genial presence and bonhomie, his interest in all newer scientific work, and also in the younger workers themselves, made him a highly popular figure.

Chauveau's published writings cover a very extensive field. Some of the more important may be mentioned. In 1868 he

published his "Nature des Virus," showing the "corpuscular state" of the virulent agents and the inactivity of the fluid in which they float. This was based on an earlier essay, entitled "Sur la Non-spontanéité des Maladies Virulentes." In the same year appeared a series of important studies on tuberculosis dealing with its virulence, the transmission by way of the digestive tract, and its contagious character in animals and man. Papers followed on the mechanism of natural contagion, on the attenuation of viruses and preventive inoculation, on the presence of pathological microbes in blood, in persons apparently in good health, on cow-pox and its relation to small-pox. Puerperal septicæmia and gangrene were also studied. While still at Lyons he published his "Traité d'Anatomie Comparée des Animaux Domestiques," the second edition of which, revised and augmented by S. Arloing—at that time professor in Toulouse—was translated into English by the late Professor George Fleming and published in 1873. Bio-chemical problems also attracted him. He and his pupils did work on glycogenesis and on the formation and use of sugar in the organism. With Kaufmann in 1886 he attempted to solve the problem whether circulating sugar can be immediately utilised by active muscles. They came to the conclusion that an active muscle, such as the masseter of the horse, uses about three and a half times as much blood sugar as the corresponding resting muscle—results confirmed later by Quinquaud in 1892 and by Morat and Dufourt in 1892.

It is, however, as the explorer of the movements of the living heart that Chauveau will probably be best remembered. As a contemporary of Ludwig and co-worker with Marey, his earliest researches were devoted to the study of the different phases of the cardiac cycle and the intracardiac pressure, the observations being made on the heart of a horse by means of the now classical cardiac sound of Chauveau and Marey, utilising Marey's method of air-transmission of variations of pressure by means of tubes and recording tambours. Probably few of the younger physiologists in this country have seen such an experiment, but as recently as the International Congress of Physiologists at Liège Chauveau repeated this famous demonstration. The horse quietly munched its oats in the stable below, while the movements of its heart were recorded in the auditorium above. The main results of this work were published in a little brochure, entitled "Nouvelles Recherches expérimentales sur les Mouvements et les Bruits normaux du Coeur," by Baillière in 1856. Fuller details may be found in Marey's "La Circulation du Sang." In 1860 Chauveau constructed, with Lortet, the haemodynamograph to measure the variations in the velocity of the blood in large arteries. Amongst other results they recorded the increase of velocity of the blood during systole of the left ventricle, and the increased rate of flow in the carotid artery during mastication.

Chauveau's personal characteristics made him widely known outside his immediate circle. He had a gracious and commanding presence. His massive, almost leonine, head, set on a powerful and strongly built body, made him a striking figure on public occasions. He was a great friend of the late Sir J. Burdon-Sanderson, and some of their work was done in the same region of physiology. Allusion has already been made to his catholicity of outlook and his encouragement of the work of younger investigators. Chauveau's long life was dedicated to the advancement of knowledge, and his memory will live as truly in the work which his encouragement and inspiration produced at the hands of his pupils as in his own many-sided achievements.

#### MARY BIRRELL DAVIES, L.R.C.P., L.R.C.S. EDIN., L.F.P.S. GLASG.

LIVERPOOL has lost a remarkable member of the medical profession by the death of Mary Birrell Davies, which occurred on Dec. 30th, 1916. She was not only a most active practitioner, but exerted a wide influence for the good of the people by her personality and organising ability. Miss Davies had a wide *clientèle* among all classes of women in a professional capacity and also as a sympathetic advisor and counsellor. For many years she had interested herself in matters having to do with social welfare and her kindness and gentleness, combined with strength of character, gave her an influence which she used to the uttermost.

Immediately after the outbreak of war she initiated the Women's War Service Bureau and organised it in conjunction

with Mrs. Herbert Rathbone, then the Lady Mayoress. This organisation has done and is still doing splendid work. In October, 1914, she went to France and did good service at Boulogne, but her failing health compelled her return towards the end of the year. Her next war work was to start and to carry into effect the Soldiers' and Sailors' Club in Lime-street, where she worked as supervisor for several months. Finally she superintended the organisation and equipment of Lady Sefton's Hospital for Officers at Croxteth Hall and remained there as resident administrator until a few weeks before her death, when her progressive illness rendered it no longer possible for her to continue there.

Among other departments of public work with which Miss Davies was connected may be mentioned the Girl Guides movement. She was instrumental in setting this going and was appointed commissioner, a position which she held to the end and in which she did invaluable work, not only in Liverpool, but for the movement generally. She was a member of the Victoria Women's Settlement, and acted as adviser to the Juvenile Employment Section of the Labour Exchange. In connexion with the Women's Patrol movement she spoke at many of the meetings, and she was an active member of the Liverpool Medical Institution Committee for Combating the Venereal Diseases from the time of its inception in 1913. Under the Home Office she held the office of inspector of children's institutes under the Children Act. Among women of the working classes she was well known and frequently addressed them with the object of inducing them to exert their responsibilities, more especially in the direction of bringing up their children to recognise the physical as well as the moral benefits of a well-ordered life.

Any appreciation of Miss Davies's life and work would be incomplete without reference to her genius for friendship with other women. "Her closest friends were so almost comically different and unlike each other that there didn't seem room for jealousy, and it only shows how many-sided she was that she needed us all to companion her properly. In her relationships towards men her infinite tact and personal magnetism, combined with her professional ability, established a kindly feeling of comradeship which did much to bring about those good relationships which have for long existed between medical men and their professional sisters in Liverpool." (We quote from the letter of a Liverpool friend.)

She was among the bravest of women. For several years she had been under the shadow of a mortal and painful illness, which she never permitted to interfere with the work that she carried out to the end with devotion and with all the energy of which her diminishing strength was capable.

**THE University College of South Wales and Monmouthshire is endeavouring to raise a sum of £100,000 for the erection of laboratories for work in relation to local industries.**

AT an inquest in the City on a woman munition-worker who died of T.N.T. poisoning in St. Bartholomew's Hospital the jury added a rider to their verdict suggesting that munition-workers should be medically examined once a fortnight.

**A RURAL ORGANISATION COUNCIL.**—With the objects of increasing the supply of home-grown food and co-ordinating and preventing the overlapping of societies concerned in improving the conditions of rural life in the homeland, a Rural Organisation Council has been formed. Some of the leading societies concerned with agricultural organisation, rural housing, rural education, local government, handcrafts, and industries have already joined the Council, which, by promoting a regular interchange of opinion between itself and the constituent societies, will, it is hoped, strengthen local efforts. A central organisation should be better able to direct collective action. As is pointed out in a circular asking for a sum of money proportional to the importance of the objects in view, the war now gives an excellent opportunity for organising a better development of the conditions of rural life against the day of disbanding, when vast numbers of sailors and soldiers will be set free, many of whom may desire a life on the land. The temporary office of the new Council is at one of the constituent societies, the National Land and Home League, Queen Anne's Chambers, Westminster, S.W., of which Lord Henry Bentinck, M.P., is the president and Lord Saye and Sele the chairman. Mr. T. Hamilton Fox is the honorary secretary of the Organisation Council.

## Correspondence.

*"Audi alteram partem."*

### A HOME MEDICAL SERVICE FOR THE TREATMENT OF SOLDIERS.

*To the Editor of THE LANCET.*

SIR.—In a leading article in your issue of Jan. 13th, referring to a proposal that greater use should be made of the part-time services of civilian doctors for the treatment of sick and wounded soldiers in this country, you say (p. 68): "We believe that in this way an economy of personnel could be effected, and more medical men found to meet the demands of the Director-General of the Army Medical Service."

I am confident that your belief is as well founded as it is widely held by large numbers of men qualified to express an opinion on the question. At the same time you refer to the well-known difficulties attached to the proposal. I believe that these difficulties are only on the surface, and would disappear if they were boldly faced. There certainly should be no difficulty in obtaining men for this home service. A properly constituted authority set up by Government and empowered to offer a moderate remuneration for the work undertaken would at once be inundated with offers, not merely of part-time but of whole-time service, by medical men who on account of age, nationality, partial invalidity, or commitments to their civilian patients could not be regarded as eligible for commissions in the R.A.M.C. The difficulty here would merely be one of selecting those best fitted for the work by their professional attainments or most suitably situated locally to carry out together their hospital duties to the soldiers and their domiciliary duties to their civilian patients.

If the personnel of the constituted authority were properly chosen, not only could these tasks of selection be well performed, but the professional work to be carried out could be wisely allocated according to the type of practice, general, consultant, or specialist, in which the applicant had previously been engaged. With such a volunteer home service enrolled there should be no difficulty in providing from it an adequate staff for any hospitals already, or hereafter to be, established for the treatment of sick and wounded soldiers in this country. There are already numerous Red Cross and private hospitals for soldiers running smoothly and efficiently, which are staffed by men of the type who would constitute this service, the only difference being that these staffs have been individually appointed to these hospitals, and do not form part of any centralised service. The existence of a central controlling authority would promote efficiency and make it easy to meet any troubles that from time to time might arise, and to remove and replace an inefficient member of the staff.

Nor should any difficulty be found in arranging for members of this home service and members of the Royal Army Medical Corps to work side by side in hospitals in which this seemed a desirable plan. Civilian doctors without commissions, part-time civilian doctors with *à la suite* commissions, and R.A.M.C. officers are conjointly staffing many hospitals now. But if this is not thought desirable, some hospitals could be staffed entirely by the home service and others by the R.A.M.C. It should not be difficult for the authorities of the Army Medical Service to select the hospitals whose transference to home service staffs would set free the largest number of R.A.M.C. officers for duty abroad. There should be no difficulty in finding funds for the payment of this service or in fixing the remuneration of its members. The cost would certainly be considerably less than that of remunerating a corresponding number of commissioned officers. There would be no need to make provision for pensions.

If I have by chance unduly minimised the difficulty of solving some of the problems indicated above there can certainly be no doubt that they are collectively incomparably easier of solution than is the problem of providing additional medical men for the Army, without dangerous depletion of the medical services of the civilian population, by any other means than by the greater use of the part-time services of civilian doctors for the treatment of soldiers. Perhaps, however, the difficulty you, Sir, have

in mind is that of persuading the Government that this step is necessary or of securing the cordial co-operation of the authorities of the Army Medical Service. If so, I venture to think that again these difficulties are exaggerated. The Government is now thoroughly alive to the fact that the war is not to be won by the fighting forces alone, but that the needs of munition workers and food producers must also be considered. The War Office, too, is learning to accept gratefully any relief from responsibilities which can be safely entrusted to others.

With the powerful assistance of the medical press there should be no insuperable difficulty in persuading the Cabinet of the urgent need of the prompt establishment of a home medical service for the hospital treatment of sick and wounded soldiers in this country.

I am, Sir, yours faithfully,  
London, N.W., Jan. 15th, 1917. LAURISTON E. SHAW.

### THE DEFINITION OF ACUTE ALCOHOLISM.

*To the Editor of THE LANCET.*

SIR.—In a letter in your issue of Jan. 13th Dr. Chalmers Watson draws attention to the curious fact that, while drunkenness amongst women in Edinburgh, as measured by the police returns, decreased materially last year, there was at the same time a large increase in the number of female patients admitted to the Royal Infirmary suffering from "acute alcoholism." It would be interesting, and might, perhaps, help towards the explanation of this apparent paradox, if Dr. Watson would indicate whether there has been an alteration in the type as well as in the number of the cases included under this latter heading—whether, for instance, cases of delirium tremens have increased in the same proportion as the other conditions grouped with it under the general denomination of "acute alcoholism." Amongst the various suggested indices of excessive drinking statistics of delirium tremens have the very decided advantage that they refer to a tolerably well-defined and easily recognisable clinical condition, and are, therefore, less liable to disturbing influences arising from the differing judgments and points of view of different observers. The official returns published in the daily press show that statistics of this disease have been found to be a useful and reliable means of gauging alcoholism in England; it would be in accordance with accepted medical views to anticipate that they would be even more valuable in Scotland, where spirits are the predominant form of alcoholic beverage.—I am, Sir, yours faithfully,

London, Jan. 17th, 1917. W. C. SULLIVAN, M.D. R.U.I.

### DENTAL SURGERY AND INJURIES OF THE JAW.

*To the Editor of THE LANCET.*

SIR.—In the *Annus Medicus* of your issue of Dec. 30th the treatment of war injuries of the jaws was discussed under the heading of Dental Surgery. This raises an important question—the question of personnel. The principles to be observed in the treatment of fractures are fundamentally the same whatever bone be involved. The end in view is the attainment of firm union without deformity and without loss of function. The means to be employed will be largely determined by anatomical factors. It is as regards this anatomical factor only that a fractured jaw differs from a fractured femur. The means to the desired end may briefly be classified as mechanical and surgical, used more particularly in the narrower sense of operative. The dental surgeon is fitted by his training and experience to devise and construct mechanical apparatus for the efficient and accurate retention of fractured fragments in their normal positions. In the simpler forms of fracture, by the employment of such means as his daily work has made him familiar with, he may attain good results and may rightly be charged with the sole responsibility for the conduct of the case. A great number of the fractures occasioned during this war have not been, and will not be, of this simpler type. Comminution, loss of bony substance, laceration and loss of soft parts are only too frequent. In the presence of these complicating factors the dental surgeon must necessarily feel himself at a loss. There is nothing in his previous experience to guide him; he is

unacquainted with the behaviour of analogous lesions in other parts of the body. Left to himself, he utilises, and rightly so, only such methods as he feels conscientiously entitled to employ. My contention is that these methods are totally inadequate for the efficient treatment of complicated cases. Most dental surgeons will readily grant the truth of this contention, and would only too gladly welcome active co-operation and collaboration with their respective surgeons. The attitude of surgery in this matter has exhibited a tendency to two extremes. In the early days of the war the dental surgeon was ignored; it is now becoming more and more customary for surgeons to refer jaw injuries to the unassisted care of the dentist. The results under the former system were almost consistently bad; the results under the latter system are likely to be equally unsatisfactory as regards these severer types of injury. Surgical conditions should be dealt with by surgeons. War injuries of the jaw should no more be treated by dental surgeons alone than should the treatment of such injuries be discussed exclusively under the head of dental surgery.

Active collaboration between surgeon and dentist makes for the good of the patient and for progress, and until such time as the importance of this is universally recognised and acted upon so long will discreditable failures continue to occur.

I am, Sir, yours faithfully,

Queen Anne-street, W., Jan. 12th, 1917. PERCIVAL P. COLE.

## THE PHENOMENA OF ANAPHYLAXIS.

*To the Editor of THE LANCET.*

SIR.—As it does not seem to be generally known, it may be of use to point out that after serum injections anaphylactic symptoms coming on at once and serum rashes coming on after an interval are rapidly controlled by subcutaneous injections of pituitrin. In anaphylaxis 1 c.c. given at once relieves the collapse and spasm of the bronchioles within a few minutes. The dose should be repeated if the symptoms show any sign of returning. A similar plan is equally successful in serum rashes.

I am, Sir, yours faithfully,

W. M. CROFTON, M.D. N.U.I.  
Laboratory of Special Pathology, University College,  
Dublin, Jan. 14th, 1917.

## THE NOMENCLATURE OF "INTERNAL SECRETION."

*To the Editor of THE LANCET.*

SIR.—I hope and think that on reflection Sir Edward Schäfer will regret the arrogant tone he adopted in his letter in your issue of Jan. 13th concerning the nomenclature of "Internal Secretion." It is quite unworthy of his high position. I regret extremely that, in the circumstances he has created, an effective answer must necessarily contain a few remarks that will perhaps increase his displeasure. I hasten to apologise in advance, for controversy is better carried on in a spirit of mutual consideration.

To deal first with the last sentence in his letter. Professor Schäfer asserts, "I have at least as good a right as Dr. Blair Bell to suggest an appropriate nomenclature for what is after all to some extent my own progeny." With regard to the "right" he claims, I am sure no one will deny that everyone who has worked at the subject has an equal right in this matter. I have never hinted anything to the contrary. As to the assertion that the internal secretions are the progeny of Sir Edward Schäfer—well, I hardly know what to say; it seems unnecessary to say anything, so common is the knowledge that they were brought into existence long before Sir Edward Schäfer was born. If by "to some extent" he means to pay a well-deserved tribute to the numerous able collaborators with whom he has worked, why put it in such a back-handed and vainglorious manner? If by this qualification he means that he has helped to wash and nurse a lusty infant, I am sure all will agree that he has done well in the matter; but even this does not give him the right to claim the offspring as his own.

Now as to the subject under discussion. Let me say at once that I do not think my remarks regarding Sir Edward Schäfer's terminology can be described as "censure"—that is a strong term, and one which implies far more than could be extracted from my words. Besides, if he will look again at my letter he will find that I do not, as he states, attribute

the word "endocrine" to him. I am glad, however, that he tacitly admits that "endocrine" is a badly formed word. Indeed, it would hardly be a greater classical crime to make it mean "internal hair" instead of the present interpretation. This being so, I am surprised that one who later on tries to trip me up on a somewhat similar point, should demand its perpetuation.

With regard to Sir Edward Schäfer's objection to my suggested terms "hormopoietic" and "hormopoiesis," I have already said I do not approve of "endocrinist," even though my sense of correct word-formation has compelled me to use it in the past in preference to "endocrine." I think that all will admit that "hormopoiesis" is more euphonious than "hormonpoiesis," which at first I thought of suggesting; and I think that there are plenty of instances to be found of such shortening—for example, "antacoid." I take it that for philological purposes the root "horm-" is the one common to the noun "hormone" and the verb from which it was derived; but by all means make the word "hormonpoiesis" if it will help the uninitiated. Further, I am afraid I must accuse Sir Edward Schäfer of having no imagination, for a very little would have shown him that even if the root "horm-" were derived from *δρμος* it would not be inappropriate, for do not the hormones connect—link up—the tissues of the body; Q.E.D., as Euclid used to say. Again, I must emphasize the fact that it would be an untold advantage, especially to students, to have some direct sequence in our terminology of the subject.

With regard to the complaint of my "following most authors" and limiting the term "hormone," perhaps the following statements from my Arris and Gale lectures may make quite clear my position, which, oddly enough, appears to be even less limited than that of Sir Edward Schäfer: "It is probable that every cell in the body is a ductless gland, and has some influence on the life and functions of the rest. .... The aggregations of specialised cells for the regulation of the body metabolism, which are known as the ductless glands .....".<sup>1</sup> Further, I can assure Sir Edward Schäfer that I am quite familiar with his own small work on "The Endocrine Organs" and with the classical paper of Bayliss and Starling to which he refers in his book and letter. Unfortunately, I am too well acquainted with the paper of Bayliss and Starling for Sir Edward Schäfer's comfort, for had he been as well acquainted with it as he professes he would have avoided a mistake, of which, judging from the tone of his letter, he is incapable. There is no mention of the word "hormone" or of the term "chemical messenger" in this paper. Since there are only about a dozen references in the whole volume such a mistake is inexcusable, and to make capital of it against me is ludicrous.

I have already said that there is nothing against the words "chalone" and "antacoid" as verbal trifles, but they are superfluous, and tend to burden the nomenclature of the subject. But to say that the provocation or production of inhibition—Sir Edward Schäfer calls it "provoking prevention"—is a contradiction in terms is singularly unfortunate. Here, too, a little imagination would probably have brought as much understanding as is possible in regard to inhibition produced by hormones—a phenomenon, indeed, which is little understood, even if it be admitted.

I am, Sir, yours faithfully,  
W. BLAIR BELL.

## THE LIQUOR TRAFFIC AND THE FOOD QUESTION.

*To the Editor of THE LANCET.*

SIR.—There is no magic, necessarily, in State control—only wise enactments thereafter would achieve the avowed object. My point is that such legislation, if carefully thought out and really sane and practicable, can just as well be applied without purchase of the Drink Interest as with it. This is most important from the point of view of husbanding the nation's finances and avoiding the colossal addition to the National Debt which purchase would mean.

I am, Sir, yours faithfully,  
Whitehall Court, S.W., Jan. 13th, 1917. HENRY CURTIS.

# The War.

## THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue:—

### *Wounded.*

- Capt. J. Crawford, R.A.M.C.
- Capt. D. W. F. Jones, R.A.M.C., attached King's Royal Rifle Corps.

## DEATHS AMONG THE SONS OF MEDICAL MEN.

The following son of a medical man must be added to our lists of those who have fallen during the war:—  
Second Lieut. C. S. Dalziel, Durham Light Infantry, youngest son of Dr. W. Dalziel, of South Shields.

## THE HONOURS LIST.

The following awards to medical officers are announced:—

### *Military Cross.*

- Capt. Edward James Blair, R.A.M.C.

For conspicuous gallantry and devotion to duty. He tended and dressed the wounded under heavy fire continuously for 18 hours. He set a splendid example of courage and determination throughout.

- Capt. Hawtrey William Browne, R.A.M.C.

For conspicuous gallantry and devotion to duty. He made a tour of five regimental aid posts under very heavy fire and carried in many wounded men. He set a splendid example throughout.

- Temp. Capt. William George Thomas Hepplewhite, R.A.M.C.

For conspicuous gallantry and devotion to duty. He worked unceasingly day and night supervising his bearers, clearing the wounded under very heavy fire. He set a splendid example throughout.

- Temp. Capt. Herbert Bruce Low, R.A.M.C.

For conspicuous gallantry and devotion to duty. He dressed the wounded and supervised the work of the bearers under very heavy fire. He set a splendid example of courage and coolness throughout.

- Capt. John Wright Malcolm, R.A.M.C., Spec. Res.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in constantly directing bearer squads under heavy fire. On another occasion he rescued several men who were buried.

- Temp. Capt. Victor Harold Mason, R.A.M.C., East Yorks Regiment.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in tending and dressing the wounded under very heavy fire.

- Temp. Capt. Lloyd Remington Meech, R.A.M.C.

For conspicuous gallantry and devotion to duty. He worked continuously for 48 hours collecting wounded under very heavy fire. He set a splendid example throughout.

- Temp. Lieut. Alexander Gordon Peter, R.A.M.C.

For conspicuous gallantry and devotion to duty. He tended and dressed the wounded under very heavy fire, displaying great courage and determination throughout.

- Temp. Lieut. Albert Edward Sutton, R.A.M.C.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in tending the wounded under heavy fire. He worked single-handed all night in an advanced post.

- Temp. Capt. Harold Ernest Pierpoint Yorke, R.A.M.C.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in tending the wounded under very heavy fire. Later, although himself wounded, he continued to carry out his work.

- Capt. William Malloch Hart, Canadian A.M.C.

For conspicuous gallantry and devotion to duty. He displayed great courage and skill in evacuating wounded under most trying conditions. On one occasion he worked for several hours in the open under heavy fire attending to the wounded. He has previously done fine work.

- Capt. Tom Welsh, S. African Med. C., attached South African Infantry.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in organising and leading stretcher parties under very heavy fire.

It is officially announced that the name of Capt. Robert Burgess, R.A.M.C., is to be deleted from the list of those to whom the Military Cross is awarded (THE LANCET, Jan. 6th, 1917, p. 38).

A SUPPLY dépôt for the St. John Ambulance Brigade has been opened at Halkyn House, Belgrave-square, S.W.

## OBITUARY OF THE WAR.

### ERNEST HOWE, M.B., CH.B. VICT., LIEUTENANT, ROYAL ARMY MEDICAL CORPS.

Lieutenant E. Howe, who died last month of wounds contracted on active service, was 30 years of age. He received his medical training at the Owens College, Manchester, and Manchester Royal Infirmary, graduating M.B., Ch.B. of Victoria University in 1909.

After holding the appointment of house physician at Manchester Royal Infirmary he settled in practice at Hazel Grove, near Stockport, until the need for medical officers in the R.A.M.C. became pressing, when he applied for a commission, which he obtained in October, 1916. He was sent out to Salonica and was resting after taking his turn in the trenches when he was wounded in several places by fragments of shell during an air raid.

One portion penetrated the chest and death rapidly resulted from shock. Lieutenant Howe had not practised long in Hazel Grove, but had already, by his devotion to work and consideration for others, established himself in the esteem of his patients and professional colleagues. He leaves a widow and two young children.



### BENJAMIN RICHARD ROBERTS, L.R.C.P. & S. EDIN., L.F.P.S. GLASG., LIEUTENANT, ROYAL ARMY MEDICAL CORPS.

Lieutenant B. R. Roberts, who was killed in action in France early in August last, was educated at Queen's College, Galway, and at the Royal College of Surgeons, Edinburgh, where he took the triple qualification of the Scottish Colleges in 1898. Three years later he went out as civil surgeon attached to the R.A.M.C., serving in this capacity during the Anglo-Boer War. Shortly after the declaration of peace in 1902 he was appointed acting district surgeon at Barberton, and subsequently medical officer in charge of the native refugee camps at Kroonstad and Vereeniging. In November, 1903, he joined the medical staff of the Central South African Railways in the Orange River Colony, and in the following year was sent to Johannesburg as additional railway medical officer, a post which he filled until early in 1916, when he volunteered for active service in France. His death was due to a shell



explosion, and was instantaneous. The news of Lieutenant Roberts's death came as a great shock to the many railway men who had known him, and amongst whom his genial kindness and skill made him deservedly popular. He took a keen interest in Volunteer work, and was for years medical officer to the Railway Volunteer Engineering Corps as it then existed. Lieutenant Roberts leaves a widow and two young sons, with whom much sympathy is felt.

## THE CENTRAL MEDICAL WAR COMMITTEE.

At a meeting of the Central Medical War Committee held on Wednesday afternoon last it was decided to join with the Committee of Reference of the English Royal Colleges and the Scottish Medical Services Emergency Committee in submitting a memorandum to the Director of Public Services on the subject of the organisation of the whole of the medical profession for the purposes of the war and of the existing national circumstances, and asking for an early interview.

## THE SUPPLY OF KNITTED ARTICLES FOR THE FORCES.

The supply of sweaters and other knitted articles absolutely needed for the comfort of the men in the Navy and Army is running short, not probably through decrease of effort so much as because the numbers to be supplied have happily much increased. In these circumstances we call the attention of our readers to the following letter which we received last week from Mr. John Penoyre, 8, King's Bench-walk, Inner Temple, London, E.C.:

It has been my good fortune to transmit to the men in the field some 32,000 sweaters since the war broke out. Sir Edward Ward, the Director-General of Voluntary Associations, now asks if, without letting the sweater industry go down, I could "do the same for the men's mufflers, of which a very great quantity are wanted at once." The sweater pattern, easy and economical, is to be had here for asking, but the W.O. formula for mufflers is so short that I hope you may find room for it at once. The muffler should measure 58 in. by 10 in. and be made on two No. 7 needles, taking 10 oz. of fairly thick drab or khaki wool. One knows of the enormous amount of well-considered work that has been done for the men all over the country. I feel, however, that one has but to name the incredible numbers that our armies have recently reached to justify asking this further effort. I am authorised, then, to state that the need for sweaters, mufflers, and all other hall-marked comforts is great and immediate, and that these should be sent either to the Voluntary Organisations Depots throughout the country, or to the D.G.V.O.'s Depot at 45, Horseferry-road, S.W., or to me as above.

When any of our readers are confronted with patients or the friends of patients whose time is not fully occupied it will be useful to bring Mr. Penoyre's movement before them.

## THE EDITH CAVELL HOMES OF REST FOR NURSES.

—Lieutenant-Colonel Sir Richard C. Temple, as chairman of the council for the institution of these homes, recently drew attention to the fact that the officers of H.M.H.S. *Britannic*, then about to proceed to the Near East, had offered voluntarily to make a collection for the homes. Soon afterwards the *Britannic* was torpedoed and some of the staff lost, but the following letter from Captain H. Slater, R.A.M.C., to Sir Richard Temple shows the interest taken by the nursing sisters and medical staff on board:—

St. Brideaux, Devonport.

DEAR SIR.—There was collected on H.M.S. *Britannic* the sum of £13 15s. 1d.; of this I placed £9 8s. 7d. in charge of the Purser, and it went down with the ship, but I hope to get this refunded. In the meantime, I send you my cheque for the balance, £4 6s. 6d. I may say that we had hoped to collect £30, and no doubt we should have done so except for our unfortunate misadventure. A very general interest was shown in the proposed homes by the nursing sisters and the troops of the R.A.M.C. Our most energetic collector was Lieutenant J. Cropper, R.A.M.C., who lost his life, being cut to pieces by a propeller.

The example of the staff of the ill-fated *Britannic* in respect of the Edith Cavell Homes is one that we hope may be widely followed.

THE NEW ONTARIO MILITARY HOSPITAL.—The opening of the new Ontario Military Hospital at Coburg, Ont., in what was once Victoria College, the forerunner of Victoria University, Toronto, is fresh evidence of the enterprise of the Ontario Government for the welfare of returned soldiers. The hospital has been established by the Ontario Government for the treatment of returned soldiers who are suffering from mental disease due to shell shock or other causes, and is under the supervision of the Canadian Hospitals Commission. Dr. F. S. Vrooman, of the Brockville Hospital for the Insane, is medical superintendent, and the other members of the staff have been drawn from institutions in the province. The hospital is equipped with continuous baths, radiant-light and radiant-heat cabinets, electric baths, Scotch douche, needle, shower, and sitz baths, and has

accommodation for 150 patients, although only 70 beds are occupied at present. So far some 40 per cent. of the cases have been discharged cured or much improved, others have been removed to institutions for permanent care. The hospital is claimed to be the first of its kind in the Empire outside the British Isles.

HEALTH OF THE GERMAN ARMY.—A wireless message from the Berlin Admiralty gives health statistics for the German Army during the second year of war. The message states that small-pox was non-existent, typhoid had diminished by three-quarters, dysentery and cholera by one-third. The incidence of phthisis and pneumonia had sunk to about one-half. Of the wounded, 70 per cent. returned to the front and 6 per cent. were unfit for further military service. The mortality in the base military hospitals amounted to 1 per cent. The total number of soldiers blinded during the war was 1250.

## Medical News.

EXAMINING BOARD IN ENGLAND BY THE ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—At the quarterly examination in Practical Pharmacy held on Jan. 11th the following candidates were successful:—

Hector Demetrius Apergis, Guy's Hospital; Edwin Alfred Clegg, Middlesex Hospital; Alan Andreas Cockayne, Cambridge University and St. Thomas's Hospital; William Arnold Clements, Birmingham University; Arnold Edgar Colle, Cambridge University and Middlesex Hospital; Ernest James Coombe, St. George's Hospital; Cecil Lucas Donne, Middlesex Hospital; Saad El Din Ahmed El Daab, Cairo and St. Bartholomew's Hospital; Armin Frank Fuoss, Birmingham University; Lawrence Gill, Guy's Hospital; Sydney Limbery Higgs, Cambridge University and St. Bartholomew's Hospital; Joseph Christopher Campbell Howe, Guy's Hospital; Leslie Cliford Moore, Liverpool University and St. Thomas's Hospital; Graham Murray-Shore, private study; Sydney Watson Page, Cambridge University and St. Bartholomew's Hospital; Maurice Pearson, Guy's Hospital; Rupert Idris Rhys, University College, Cardiff, and St. Bartholomew's Hospital; Lewis Henry Douglas Thornton, Cambridge University and Middlesex Hospital; William Stephen Tunbridge, Oxford University and St. Bartholomew's Hospital; Herman Crowther Viehoff, Liverpool University; William Harold White, St. Thomas's Hospital; Catherine Mabel Williams, London School of Medicine for Women; and Vyvian Deane Wyborn, Charing Cross Hospital.

LETTERKENNY MEDICAL OFFICERSHIP.—Our Belfast correspondent writes: Nowhere but in Ireland could such extraordinary topsy-turvy situations arise as have occurred in relation to the medical officership of Letterkenny Dispensary. At a meeting of the board of guardians, held on Jan. 12th, the political party which was previously in the minority found themselves by mere chance in the majority, with the result that the account of Mr. T. Patterson for £5 8s. for acting as locum-tenant for Dr. J. P. McGinley during the latter's absence at the winter assizes was refused, on the grounds that the Local Government Board had not sanctioned the appointment of either of these medical men. Dr. W. N. Walker's bill, for acting as temporary medical officer (he having been recognised by the Local Government Board) was ordered to be paid, the amount being £79 9s. 10d. Finally the items on the pay-sheet for Dr. McGinley were refused to be sanctioned for payment, on the grounds that his appointment had not been sanctioned by the Local Government Board.

ROYAL INSTITUTE OF PUBLIC HEALTH.—A course of lectures is being delivered under the auspices of this Institute dealing with public health problems under war and after the war conditions. The lectures are delivered on the Wednesdays of January, February, and March at the lecture room of the Institute, 37, Russell-square, London, at 4 P.M., and the delivery of the first two by Miss Janet Lane-Claypon, M.D., and Mrs. Scharlieb, M.D., respectively, have already been announced. The lectures still to come are as follows:—Jan. 31st: Dr. Chas. John Macalister on the Prevention and Arrest of Venereal Disease in Men. Feb. 7th: Lady Barrett, M.D., on the Rôle of the Midwife and the Protection of Motherhood. Feb. 14th: Lieutenant-Colonel S. A. M. Copeman, M.D., F.R.S., on the Prevention and Arrest of Infectious Disease in War-time. Feb. 21st: Dr. T. D. Lister on the Tuberculosis Problem in War-time. Feb. 28th: Dr. W. G. Savage on the Protection of the Milk-supply. March 7th: Professor F. G. Hopkins, F.R.S., on the Selection and Preparation of Foods in War-time. March 14th: Dr. E. L. Collis on the Protection of the Health of Munition Workers. March 21st: Professor Sir Thomas Oliver, F.R.S., on the Hygiene of Occupation in War-time. March 28th: Lieutenant-Colonel Sir A. Pearce

Gould, K.C.V.O., on Personal Habits in Relation to Public Health in Time of War. Prominent workers in connexion with the various different subjects have promised to be present at the lectures and to take part in any discussion which arises.

THE gross takings of a disorderly house in Torrington-square were stated, at a prosecution at Bow-street police-court this week, to be at the rate of over £5000 a year.

THE Home Secretary has extended until Feb. 28th the time during which unregistered dentists may purchase preparations containing not more than 1 per cent. of cocaine.

THE National Institute of Mothercraft has received an anonymous donation of £5000 to equip and maintain its ante-natal clinic.

## Appointments.

*Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

DOUBLEDAY, F. N., L.R.C.P., M.R.C.S., L.D.S. Eng., has been appointed Dental Surgeon to King George Military Hospital.

ROBERTS, A., M.D. St. And., Certifying Surgeon under the Factory and Workshop Acts for the Harrogate District of the County of Yorks. West Riding.

Boss, B. H., M.R.C.S., L.R.C.P. Lond., to be Certifying Surgeon under the Factory and Workshop Acts for the City of London.

## Vacancies.

*For further information regarding each vacancy reference should be made to the advertisement (see Index). When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.*

BIRKENHEAD UNION INFIRMARY.—Junior Female Resident Assistant Medical Officer. Salary at the rate of £250 per annum, with board, &c.

BIRMINGHAM CITY.—Female Doctor for Infant Welfare Work. Salary £350 per annum.

BIRMINGHAM CITY EDUCATION COMMITTEE.—Temporary Assistant School Medical Officer. Salary £300 per annum.

BOLTON INFIRMARY AND DISPENSARY.—Female Second House Surgeon. Also Female Third House Surgeon. Salaries £200 and £180 per annum, respectively, with board, &c.

BRADFORD ROYAL INFIRMARY.—Medical Officer in Charge of Out-patients. Salary at rate of £250 per annum. Also Female Medical Officer for Out-patients. Salary £125 per annum.

BRISTOL GENERAL HOSPITAL.—House Surgeon for six months. Salary at rate of £175 per annum, with board, &c.

CAMBRIDGE, ADDENBROOKES HOSPITAL.—Honorary Assistant Surgeon in Out-patients' Department.

CHESTERFIELD AND NORTH DERBYSHIRE HOSPITAL.—Second House Surgeon. Salary £150 per annum, with board, &c.

COVENTRY EDUCATION COMMITTEE.—Temporary Assistant School Officer. Salary £350 per annum.

DUMFRIES, Crichton Royal.—Temporary Pathologist and Clinical Pathologist, unmarried. Salary £300 per annum, with board, &c.

GRIMSBY AND DISTRICT HOSPITAL.—House Surgeon. Salary £5 5s. per week, with board, &c.

HARROGATE INFIRMARY.—Resident House Surgeon.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.

—House Physician for six months. Salary 30 guineas.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.—House Surgeons, Assistant Casualty Medical Officer, and House Physician, unmarried. Salary at rate of £60 per annum each, with board, &c.

KENSINGTON BOARD OF GUARDIANS WORKHOUSE AND INFIRMARY.—Second Assistant Resident Medical Officer. Salary £160 per annum, with board, &c.

LEAMINGTON SPA, WARNEFORD GENERAL HOSPITAL.—Junior Resident Medical Officer. Salary £150 per annum, with board, &c.

LEEDS GENERAL INFIRMARY.—Resident Aural Officer. Salary £100 per annum, with board, &c. Also Ophthalmic House Surgeon. Salary £50 per annum, with board, &c.

LEICESTER CORPORATION.—Female Second Resident Medical Officer for Isolation Hospital and Sanatorium, Groby-road. Salary at rate of £250 per annum, with board, &c.

LISBURN, WALLASLEY, VICTORIA CENTRAL HOSPITAL.—House Surgeon. Salary £250 per annum.

NEWCASTLE-UPON-TYNE, ROYAL VICTORIA INFIRMARY.—Female Assistant in Venereal Diseases Department.

ORTHUMBERLAND CHILDREN'S CONSUMPTIVE SANATORIUM, Stannington.—Female Resident Medical Officer. Salary £200 per annum, with board, &c.

NOTTINGHAM AND MIDLAND EYE INFIRMARY.—Female House Surgeon. Salary £120 per annum.

PLAISTOW HOSPITAL FOR INFECTIOUS DISEASES, London, E.—Temporary Resident Medical Officer. Salary at rate of £250 per annum, and all found.

QUEEN MARY'S HOSPITAL FOR THE EAST-END, Stratford.—House Surgeon.

ROCHESTER, ST. BARTHOLOMEW'S HOSPITAL.—Clinical Assistant. Salary at rate of £110 per annum, with board, &c.

ST. GEORGE'S HOSPITAL, Hyde Park Corner, S.W.—Surgical Registrar. Salary £200 per annum, with board, &c.

ST. MARK'S HOSPITAL, City-road, E.C.—House Surgeon.

ST. PANCRAS DISPENSARY, 39, Oakley-square, W.—Resident Medical Officer. Salary £150 per annum, with residence, &c.

SCOTLAND, NAVAL AUXILIARY HOSPITAL.—Assistant Surgeon and Medical Officer. Salary £1 per day, with board, &c.

SHEFFIELD ROYAL HOSPITAL.—Assistant House Surgeon, unmarried. Salary £120 per annum, with board, &c.

SOUTHAMPTON PARISH INFIRMARY, Shirley Warren.—Resident Assistant Medical Officer. Salary £250 per annum, with board, &c.

STAFFORDSHIRE, WOLVERHAMPTON, AND DUDLEY JOINT COMMITTEE FOR TUBERCULOSIS, MOXLEY SANATORIUM, near Wednesbury, Staffs.—Resident Medical Officer. Salary £350 per annum, with board, &c.

SUNDERLAND ROYAL INFIRMARY.—Female House Surgeon. Salary £150 per annum, with board, &c.

UNIVERSITY OF LONDON.—External Examiners.

VICTORIA HOSPITAL FOR CHILDREN, Tite-street, Chelsea, S.W.—House Surgeon for six months. Salary at rate of £200 per annum, with board, &c.

WIGAN, ROYAL ALBERT EDWARD INFIRMARY AND DISPENSARY.—Resident Surgical Dresser.

WORCESTER, CITY OF.—Female Temporary Assistant Medical Officer. Salary £350 per annum.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of a vacancy for a Certifying Surgeon under the Factory and Workshop Acts at Amlwch, Anglesey.

## Births, Marriages, and Deaths.

### BIRTHS.

MAXWELL.—On Jan. 3rd, at Prince's-gate, W., the wife of Lieutenant H. B. Maxwell, R.A.M.C., of a son.

ROBIN.—On Jan. 2nd, at Sidmouth, the wife of Arthur Robin, M.D., of a son.

WILSON.—On Jan. 10th, at Harley-street, W., the wife of Dr. S. A. Kinner Wilson, of a son.

YOUNG.—On Jan. 10th, at Inverness-gardens, Kensington, the wife of Captain (Temporary) F. P. Young, R.A.M.C., of a daughter.

### MARRIAGES.

BURD—WALKER.—On Jan. 8th, at All Saints, Bournemouth E., Lycett Burd, M. Cantab., to Elizabeth, daughter of the late E. V. Walker, Dewsbury.

COLLEDGE—BRACKENBURY.—On Jan. 15th, at St. Stephen's Church, Hampstead, Lionel Colledge, Captain, R.A.M.C., to Margaret Mary, eldest daughter of Admiral J. W. Brackenbury, C.B., C.M.G., and Mrs. Brackenbury, of Belgrave-square, Hampstead.

HART—PEARSON.—On Jan. 9th, at St. Barnabas Church, Addison-road, W., William Malloch Hart, M.C., C.A.M.C., to Mary Dorothy, only daughter of E. W. Pearson, of the Inner Temple, Barrister-at-Law, and Mrs. Pearson.

HOFFMAN—WENDEN.—On Jan. 6th, at Dursley Parish Church, Geoffrey Arthur Hoffman, M.B., to Mary, eldest daughter of Major Wenden, V.D., "The Chantry," Dursley.

LESLIE—LUPTON.—On Jan. 13th, at Essex Church, Kensington, Captain William Leslie, R.A.M.C., to Mary Beatrice, third daughter of Henry Lupton, of Torquay.

WEAVER—SIPPE.—On Jan. 9th, at St. Paul's, Portman-square, L. Bargrave Weaver, L.D.S. Eng., to Esther, youngest daughter of Mr. and Mrs. Charles H. Sippe, of Beckenham, Kent.

### DEATHS.

BROWN (Chester-le-Street).—At 4, Red Rose-terrace, on the 9th inst., William James, son of the late James Brown, of Dublin, and dearly beloved husband of Frances Ann Brown, daughter of the late Dr. Paul Maude Edger, of Hartlepool. Born at Dublin Feb. 21st, 1849. Educated at Professor Graham Bell's School, Dublin, Bishop Stortford Collegiate School, Herts., and Institution Berchoud Asnières, near Paris; B.A., M.B. Dublin; L.R.C.S.I.; L. Med.; L.M.I.D., T.C.D., and L.M., Rotunda Hospital, Dublin; Certifying Factory Surgeon; late Surgeon-Captain 4th D. I. I.; late Surgeon to the Chester-le-Street Ironworks; Examiner for Army and Militia recruits; late Medical Officer to Newcastle-on-Tyne Borough Lunatic Asylum; late House Surgeon and Secretary to the Harlepool Hospital; contributor to the *British Medical Journal*, *Lancet*, and *Journal of Medical Science*; Past Master of the Earl of Durham Lodge of Freemasons, P.P.G.P. Grand Provincial Lodge, Durham, and a member of the Royal Arch Chapter of Concord.

FLOWER.—On Jan. 14th, at Boscombe, Hants. Frederick Isaac Flower, M.R.C.S., L.R.C.P., formerly of Warminster, Wilts., in his 75th year.

GOWANS.—On Jan. 15th, at Broughty Ferry, Dundee, James Gowans, M.B., C.M.

HAMILL.—On Jan. 7th, at Clowes House, Higher Broughton, Manchester. Dr. J. Wilson Hamill.

MORRIS.—On Jan. 8th, at Parkside, Feltham, Middlesex, Colin Dwight Morris, M.R.C.S., L.R.C.P., L.S.A., aged 58.

MUNRO SMITH.—On Jan. 13th, at Apesley-road, Clifton, Bristol. George Munro Smith, M.D., L.R.C.P. Lond., M.R.C.S., Hon. and Consulting Surgeon to the Bristol Royal Infirmary, late Lt.-Colonel R.A.M.C. (T.).

SANSOM.—On Jan. 9th, at West End-lane, West Hampstead, Harry Arthur Sansom, M.D., aged 53.

WELCH.—On Jan. 11th, at Blenheim-gardens, Cricklewood, John Welch, M.D., aged 92.

N.B.—1/- fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

## Notes, Short Comments, and Answers to Correspondents.

**THE EARLY TREATMENT OF GUNSHOT WOUNDS.**  
 In the *Quarterly Review* for October, 1916, Dr. Charles Singer published an interesting article under this title, accompanied by four pages of illustrations depicting (1) "An instrument for straightening a stiff and contracted joint"; (2) "Cauterising a wound" (both from Gersdorff, 1517); (3) "Ambrose Paré, aged 75"; and (4) (a) "The stork-beak wound dilator," (b) the "Alphonsinum" (a sort of "porte-crayon" bullet extractor, named after Alfonso Ferri, 1515-95), and (c) Paré's artery forceps. Eight books on the history of medicine are chiefly referred to—viz.: Brunschwig 1497, Giovanni de Vigo 1514, Hans von Gersdorff 1517, Conrad Gesner 1555, "Paré's Works" by J. F. Malgaigne 1840, Theodor Billroth 1859; "Ambrose Paré and his Times," by Stephen Paget, 1897; and the "History of Surgery," by E. J. Gurit, 1898. In respect of the invention of gunpowder, Dr. Singer refers to the "semi-mythical German monk, Berthold the Black, about the year 1313." This is our old school hero, "Schwarz" anglicised, whose name was really, according to some authorities, "Konstantin Anklitzel," though most of us will always call him "Schwarz." Among other notables who cross Dr. Singer's stage may be mentioned the fourteenth-century Czech general, John Ziska, who became blind without resigning his command, and Matthias Corvinus (d. 1490), King of Hungary, who was a son of "Hunjadi Janos," whose name is familiar to many, having been borrowed for an aperient water years ago. Bartolomeo Maggi (d. 1552), a Bolognese military surgeon, and Leonardo Botallo, a Piedmontese anatomist (fl. circa 1550), and their support of some of Paré's doctrines on gunshot wounds are referred to, as well as Laurent Joubert (1529-83), Paré's most influential supporter, and Felix Wirtz (1514-74) of Basel, a Swiss and friend of Conrad Gesner. Wirtz was much praised by Billroth and other German writers. In conclusion, the level of surgery in England during the sixteenth century is discussed and the names of Thomas Gale (1507-87) and William Clowes the elder (1540-1604) are mentioned, with a quotation from the latter's work published in 1588: "A prooved practise for all young Chirurgions, concerning burnings with Gunpowder, & wounds made with Gunshot, Sword, Halbard, Pike, Launce or such other." Dr. Singer says that Clowes was a master of vituperative controversy. He writes very hardly of the "wicked brood of beastly abusers of Phisicke and Chirurgie, daylie more and more increasing to the utter undoing of many." We notice a double reference to "Heinrich von Pfolsprundt." Dr. Garrison in his "History of Medicine" spells this "Pfolspeundt." The date of Matthias Corvinus's birth is given in reference books as 1443 and not 1450. Maggi's year of birth is queried by Dr. Singer as "1477." Dr. Garrison states 1516; and the year of Ambrose Paré's birth, which Dr. Singer gives as 1510, has been given in many French and English books as 1517; but here there is some confusion probably.

### VITAL STATISTICS OF GIBRALTAR.

THE Gibraltar Blue-book for 1915 gives the estimated civil population of the city and harbour as 8707 males and 9236 females—total 17,943, showing a decrease of 1643 as compared with the census of 1911. The births registered during the year numbered 368 and the deaths 330. The total number of patients treated in the Colonial Hospital was 784 and there were 59 deaths. Of 291 who underwent surgical operations, 7, or approximately 2 per cent., died. The number of out-patients treated was 7754. In the small-pox hospital 24 patients were treated, of whom two died. At the Tuberculosis Dispensary, under the management of the Sanitary Commissioners, the monthly attendance of patients for inspection and treatment during the year averaged 55.5. In the Tuberculosis Home, under the same management, 23 adults and 36 children were accommodated at different periods of the year. The number of patients visited at their homes by the medical officer of health averaged 30 each week; 11,396 lb. of beef and 22,905 pints of milk were distributed to patients during the year. There were 6 deaths in the Home from advanced tuberculosis. The daily average number of patients in the lunatic asylum was 34 (22 males and 12 females); there were three deaths. The mean maximum temperature for the year was 69.2° and the mean minimum 57.2°. The rainfall was 53.2 inches, as against 36.75 in the previous year.

R.—We have no information on the subject. The scheme has not yet been before the Director of Public Services. We expect the working to be left, as our correspondent suggests, at least as long as the War Office is satisfied.

## Medical Diary for the ensuing Week.

### SOCIETIES.

**ROYAL SOCIETY**, Burlington House, London, W.

**TUESDAY.**—Papers.—Lord Rayleigh O.M.: On the Dynamics of Revolving Fluid.—Hon. R. J. Strutt: Spectroscopic Observations on the Active Modification of Nitrogen. V.—Prof. J. W. Nicholson and Prof. H. Wilson: Magnetic Induction and its Reversal in Spherical Iron Shells (communicated by Prof. J. A. Fleming).—Mr. S. Brodetsky: The Two-dimensional Motion of a Plane Lamina in a Resisting Medium (communicated by Prof. G. C. Bryan).

**ROYAL SOCIETY OF MEDICINE**, 1, Wimpole-street, W.

### MEETINGS OF SECTIONS.

Monday, Jan. 22nd.

**ODONTOLOGY** (Hon. Secretaries—F. M. Smyth, F. N. Doubleday, J. Howard Mummery): at 5.30 P.M.  
Paper:

Dr. A. E. Rowlett: Conductive Anaesthesia of the Mandible.  
N.B.—Members will please note the change of time to 5.30 p.m.

Tuesday, Jan. 23rd.

**MEDICINE**, **PATHOLOGY**, **EPIDEMIOLOGY** { Combined Meeting : at 5 P.M.

### Discussion :

"The Origin, Symptoms, Pathology, Treatment, and Prophylaxis of Toxic Jaundice observed in Munition Workers and Troops." Surgeon-General H. D. Rolleston will take the chair, and the discussion will be opened by Dr. T. M. Legge, H.M. Medical Inspector of Factories.

**PSYCHIATRY** (Hon. Secretaries—Bernard Hart, G. F. Barham): at 4.30 P.M.  
Communication :

Dr. F. Sano: Morphological Investigations upon the Convolutions of Relative Brains in Man.  
N.B.—For the general convenience of members during the war, the Council has decided to hold the meetings of this Section at 4.30 p.m. instead of 8.30 p.m.

Thursday, Jan. 25th.

**BALNEOLOGY AND CLIMATOLOGY** (Hon. Secretaries—Chas. W. Buckley, J. Campbell McClure): at 5.15 P.M.  
Paper:

Dr. A. G. S. Mahomed: Distribution of Deaths from Lightning-stroke in England.

Dr. J. Horne Wilson: Galvanometric Diagnosis and Dielectric Therapy, with Description of Methods used.

(At 7.30 P.M. the members will dine together at Pagans' Restaurant, Great Portland-street, W., and members may bring guests. Members who wish to dine are requested to send their names to Dr. J. Campbell McClure, 59, Harley-street, W.)

**NEUROLOGY** (Hon. Secretaries—H. Campbell Thomson, C. M. Hindle Howell): at 8 P.M.  
A CLINICAL MEETING will be held at King George Hospital, by kind permission of Lieut.-Colonel Cottell, R.A.M.C.

Friday, Jan. 26th.

**STUDY OF DISBANE IN CHILDREN** (Hon. Secretaries—A. S. Blundell Bankart, E. A. Cockayne, C. P. Lapage): at 4.30 P.M.  
Case will be shown.

### Short Paper :

Dr. J. Porter Parkinson: Pneumonia with Hyperpyrexia followed by Heart Block.

**ROYAL SOCIETY OF ARTS**, John-street, Adelphi, W.C.  
Wednesday.—4.30 P.M., Paper:—Mr. W. A. M. Goods: Relief Work in Belgium.

**HUNTERIAN SOCIETY**, at the Royal Society of Medicine, 1, Wimpole-street, W.

Wednesday.—9 P.M., Mr. F. Kidd: Demonstration on Surgical Diseases of the Urethra.

## LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

**POST-GRADUATE COLLEGE**, West London Hospital, Hammersmith-road, W.

**MONDAY.**—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

**TUESDAY.**—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

**WEDNESDAY.**—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

**THURSDAY.**—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

**FRIDAY.**—10 A.M., Dr. Simson: Gynaecological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

**SATURDAY.**—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

**NORTH-EAST LONDON POST-GRADUATE COLLEGE**, Princes of Wales's General Hospital, Tottenham, N.

**MONDAY.**—Clinics:—10.30 A.M., Surgeon Out-patients (Mr. R. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham); Gynaecological Out-patients (Dr. Bunting). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

**TUESDAY.**—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Arnold); Surgical Out-patients

(Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Mayton). Radiography (Dr. Metcalfe). 3.30 p.m., Medical In-patients (Dr. A. J. Whiting).

**WEDNESDAY.**—Clinics:—2.30 p.m., Throat Operations (Mr. C. H. Mayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 p.m., Eye Operations (Mr. R. P. Brooks).

**THURSDAY.**—2.30 p.m., Gynaecological Operations (Dr. A. H. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 p.m., Medical In-patients (Dr. R. M. Leslie).

**FRIDAY.**—2.30 p.m., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. H. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

**ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN,** 49, Leicester-square, W.C.

**TUESDAY.**—4 p.m., Dr. C. Kempster: X Rays. Rodent Ulcer and Malignant Diseases.

**THURSDAY.**—6 p.m., Chesterfield Lecture:—Dr. M. Dockrell: Vesicular and Bullous Diseases and their Treatment.

**ROYAL INSTITUTE OF PUBLIC HEALTH,** Lecture Hall of the Institute, 37, Russell-square, W.C.

Course of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—

**WEDNESDAY.**—4 p.m., Lecture II.:—Dr. Mary Scharles: The Prevention and Arrest of Venereal Disease in Women. Dr. G. W. Saleby, Dr. Jane H. Walker, and Dr. Helen M. Wilson have promised to take part in the discussion.

**ROYAL INSTITUTION OF GREAT BRITAIN,** Albemarle-street, Piccadilly, W.

**TUESDAY.**—3 p.m., Prof. C. S. Sherrington: The Old Brain and the New Brain, and their Meaning. (Lecture II.)

### EDITORIAL NOTICES.

It is most important that communications relating to the Editorial business of THE LANCET should be addressed exclusively "To THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET should be addressed "To the Manager."

We cannot undertake to return MSS. not used.

Office: 423, STRAND, LONDON, W.C.

### MANAGER'S NOTICES.

#### VOLUMES AND CASES.

VOLUMES for the second half of the year 1916 will be ready shortly. Bound in cloth, gilt lettered, price 16s., carriage extra.

Cases for binding the half-year's numbers (inland edition) are now ready. Cloth, gilt lettered, price 2s., by post 2s. 4d.

To be obtained on application to the Manager, accompanied by remittance.

#### ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the new year, the price was raised to 8d. The rates of subscription remain as revised in October.

#### TO COLONIAL AND FOREIGN SUBSCRIBERS.

Subscribers abroad are particularly requested to note the rates of subscriptions given on page 4.

The Manager will be pleased to forward copies direct from the Offices to places abroad at the rates shown, whatever be the weight of any of the copies so supplied.

#### TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C., are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and not to THE LANCET Office.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

THE COLONIAL AND FOREIGN EDITION is published in time to catch the weekly Friday mails to all parts of the world.

### METEOROLOGICAL READINGS.

(Taken daily at 3.30 a.m. by Steward's Instruments.)

THE LANCET Office, Jan. 17th, 1917.

Date.	Sun-fall.	Star Radio in Vizor.	Maxi-mum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
Jan. 11	...	42	42	33	36	36	Raining
" 12	0.15	59	43	36	38	40	Cloudy
" 13	0.11	61	38	35	34	35	Cloudy
" 14	...	44	37	33	34	36	Overcast
" 15	0.01	38	36	33	33	34	Overcast
" 16	0.02	45	37	32	33	34	Snowing
" 17	0.10	42	37	34	35	35	Overcast

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

### BOOKS, ETC., RECEIVED.

**ARNOLD, EDWARD,** London.

The Motor Car: What it is and How to Drive. By T. O. A. Lawton and R. J. Gibson. 1s.

**BALE, JOHN, SONS, AND DANIELSSON,** London.

High Price of Sugar and How to Reduce It. By Harold Hamel Smith. 1s. net.

**CHAPMAN AND HALL,** London.

Food and Fitness, or Diet in Relation to Health. By James Long. 5s. net.

**GREEN, W., AND SOY,** Edinburgh and London.

Encyclopaedia Medica. Second edition. Under the general editorship of J. W. Ballantyne, M.D., C.M., F.R.C.P.E. Vol. IV., Bar to Filariasis. 20s. net.

**LANE, JOHN,** London and New York. S. B. GUNDY, Toronto.

Cow and Milk Book. By the Hon. Mrs. Lionel Guest. 1s. net.

**LEWIS, H. K.,** London.

Practical Bacteriology, Blood Work, and Animal Parasitology. By E. R. Stitt, A.B., Ph.G., M.D. Fourth edition. 9s. net.

**MILFORD, HUMPHRY,** London. OXFORD UNIVERSITY PRESS AND PRINCETON UNIVERSITY PRESS, Princeton.

Critique of the Theory of Evolution. By T. Hunt Morgan. Professor of Experimental Zoology in Columbia University. 6s. 6d. net.

**SAUNDERS, W. B., COMPANY,** London.

A Text Book of Pathology. By W. G. MacCallum, M.D., College of Physicians and Surgeons, New York. 35s. net.

The Expectant Mother. By S. Wyllie Bandier, M.D., Professor of Diseases of Women, New York Post-Graduate Medical School. 6s. net.

Personal Health. By Win. Brady, M.D., New York Post-Graduate Medical School. 6s. 6d. net.

Human Physiology. By Percy Goldthwaite Stiles, Assistant Professor of Physiology, Harvard University. 6s. 6d. net.

**YEAR BOOK PRESS,** Chicago.

Obstetrics (Practical Medicine Series, Vol. II.). Edited by J. B. de Lee, A.M., M.D., and with the collaboration of H. M. Stowe. \$1.35.

The following journals, magazines, &c., have been received:—

Eugenics Review, British Journal of Inheritance, Caledonian Medical Journal, Bulletin et Mémoire de la Société Médicale des Hôpitaux de Paris, British Dental Journal, Canadian Medical Association Journal, Dublin Journal of Medical Science, American Journal of Obstetrics, Malaria, Albany Medical Annals, Therapeutic Gazette, Military Surgeon, Revue d'Hygiène, British Journal of Dermatology, Annales de Médecine, Archives de Médecine et Pharmacie Navales, Journal of Comparative Pathology and Therapeutics, Public Health, American Journal of Public Health, Medical Review, Cleveland Medical Journal, Maternity and Child Welfare, Pediatric, American Journal of Medical Sciences, Surgery, Gynecology, and Obstetrics, Modern Hospital, Nordiskt Medicinskt Arkiv, Archives of Pediatrics.

### Communications, Letters, &c., have been received from—

A.—Australian Book Co., Lond.; Messrs. Arnold and Sons, Lond.; Anglo-French Drug Co., Lond.; Manager of; Messrs. Allen and Hanburys, Lond.; Aberdeen Public Library, Librarian of.

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## An Analysis

OF

### RECENT CASES OF TETANUS IN THE BRITISH EXPEDITIONARY FORCE. WITH SPECIAL REFERENCE TO THEIR TREATMENT BY ANTITOXIN.

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SOME of the medical problems of the war, though of much scientific interest, are less urgent than others, and may well await the leisureed study which will without doubt be given to them after its conclusion, but others which are more urgent appear to call for at least a partial attempt to reach agreement before the campaign grows older. Prominent among these appears to us the subject of the specific treatment of tetanus, upon which there exist wide differences of view, both as to the usefulness of antitoxin at all and, admitting its value, as to the system of its employment which may be expected to yield the best results.

Earlier in the war information with regard to tetanus in the Army in France was collected by one of us (W. B. L.) and summarised in one of the sections of the official "Memorandum on the Treatment of Injuries in War," which was published in July, 1915, and circulated to all medical officers. Further experience of the treatment of the disease has accumulated since then, but much of it relates to comparatively small groups of cases observed in a single hospital, and cases fortunately have on the whole been so few that a number of general hospitals may not have seen one for months. Recently a Tetanus Committee appointed by the War Office, under the chairmanship of Surgeon-General Sir David Bruce, has collected a large amount of most useful information in connexion with the cases which have been treated in home hospitals, and have published their results and recommendations, partly in the form of circular memoranda and partly in an article in *THE LANCET* of Dec. 2nd, 1916, by Sir David Bruce. We have remodelled some of our tables upon those adopted by Sir David Bruce, so that they may be read as complementary one to the other, and may in this way serve to bring into greater relief the points in which the experiences of home hospitals are in contrast or in accord with those acquired in the Expeditionary Force.

Early last summer it was felt that we had reason to anticipate the occurrence of a certain amount of tetanus among the large number of wounded to be expected during the coming offensive on the Somme. Although since the days of the battle of the Aisne strict orders exist that every wounded man should receive a prophylactic injection of tetanus antitoxin, and it is exceedingly rare that this is for any reason omitted, still it is well recognised that this cannot confer absolute protection. The severe character of many of the wounds is only too familiar to us all, and the heavy coating of foul mud, with which skin and uniform are almost always plastered, renders it certain that very large doses of anaerobic and other bacteria are at times driven deeply into the devitalised tissues.

Arrangements were therefore organised for the collection of detailed information in respect of every case of tetanus occurring in France, a number of questions being asked on a form which had to be completed and sent to headquarters on the termination or final disposal of the case. The information given on the sheets was then transferred to cards, which facilitated the analysis of the various points under inquiry. On the whole, the required details have been very accurately recorded, but it will be realised that at times of heavy pressure in field ambulances and casualty clearing stations it is often difficult or impossible to obtain and record the full details on certain points. These must later be ascertained; if at all, from a man who may be too ill to

cross-examine or who may own the notoriously inaccurate memory of at least the old soldier for such points as dates and hours.

We have classed the cases simply into those who died and those who recovered. At first we divided them into three classes: (1) Those whose deaths were attributed solely to tetanus; (2) those whose deaths were in larger part attributable to complications, such as severe sepsis, gas gangrene, secondary haemorrhage, &c.; and (3) the recoveries. It was found, however, that the difficulties of deciding in which subdivision to place the fatal cases were too great and too uncertain. A simple distribution into the two classes has the disadvantage that the total deaths from tetanus inevitably include a number of cases in which the condition of the wound, the exhaustion of the patient, or some complication were in themselves quite sufficient to account for death. They also comprise cases in which it was definitely stated that all symptoms of tetanus had disappeared before death. Such cases naturally weigh the scales against whatever system of treatment had been employed for the tetanic symptoms. On the other hand, however, the symptoms recorded in some cases have been so slight as to suggest the possibility that they might not have been due to tetanus at all; and, if this were so, such cases would form a counter-weight to those whose death was not due to tetanus.

The present analysis is based upon 160 cases which occurred in hospitals in France between July 1st and Oct. 31st, 1916. Of these cases 118 died and 42 recovered, a case-mortality of 73·7 per cent. This mortality may be contrasted with that of the group of cases, already alluded to, examined by one of us in the spring of 1915. In that series, among 179 cases there were 140 deaths, a case-mortality of 78·2 per cent. This, as far as it goes, does not disclose any considerable degree of improvement in the treatment employed. Both series show a heavier death-rate than that which has been recorded for the cases treated in home hospitals where, during the first year, out of 231 cases analysed by Sir David Bruce, there was a case-mortality of 57·7 per cent., and, for the second year, up to July 31st, 1916, out of 195 cases a mortality of 49·2 per cent.

These four series show a slight improvement in case-mortality on each side of the Channel, but also make it clear that cases are more fatal in France by about 25 per cent. The causes for the latter fact are so obvious as to need no labouring. The most desperate wounds, which it would be dangerous to move, and which are therefore detained in clearing stations or base hospitals, are just those which are most likely to develop tetanus, and, further, the complications of severe sepsis, gas gangrene, &c., which must be more in evidence closer to the line than in home hospitals, more frequently play a large part in determining a fatal issue in cases of tetanus.

#### INCIDENCE.

It is not permissible at the present moment to give any information upon the actual incidence of the disease among the wounded, or to contrast one period of the war with another from that point of view, but there can be no harm in mentioning an impression, which we have gathered from the figures in question, that the highest incidence will eventually be found to be associated with periods during which heavy fighting took place in wet weather. This, after all, might have been anticipated, as it is obvious that, under such conditions, the change from dust to mud will mean a heavier bacterial inoculation of the wound.

An analysis of the influence of the prophylactic dose of antitoxin upon the general incidence of the disease must, for the same reason, be passed over; but this is, fortunately, a procedure which is so fully accepted, not only by ourselves but by our Allies and our enemies, that it stands in little need of further statistical support. Were it not for the universal acceptance of the protective value of this dose we feel sure that any analysis of the subject would have had to deal not with a few hundred cases but with many thousands.

#### THE INFLUENCE OF THE SEVERITY AND CONDITION OF THE WOUNDED.

In connexion with each case information was asked for on a number of specific points, and among these were queries as to the existence of severe sepsis or gas-infection of the tissues. Details were also asked to the nature and severity of the wound, itself and whether it was single or multiple. Table I. shows the frequency with which these factors were

encountered in each group—i.e., among 113 fatal cases and 42 recovered cases. (It will be understood that, where the total number of cases shown in any table does not reach 160, the required information had not been obtained in every case.)

The table shows, as might be expected, a considerably higher percentage occurrence of these conditions among the fatal cases. The most striking contrast is that shown in the

TABLE I.—*Condition of Wounds as Regards Sepsis, Presence of Gas Gangrene, &c.*

—	Severe sepsis.	Gas gangrene.	Extensive or severe wound.	Multiple wounds.
Fatal—113 cases ... {	88 (78%)	61 (54%)	98 (87%)	62 (55%)
Recovered—42 cases {	24 (57%)	5 (12%)	26 (61%)	18 (43%)

much greater frequency of gas gangrene as a complicating factor in the cases which terminated fatally, no less than 54 per cent. of these cases having been noted as suffering from this grave complication. Its dangerous nature is but too well known, and its frequency among these cases is, to our minds, one of the chief causes of the relatively higher death-rate from tetanus in France as compared with the experience at home.

Another point in connexion with the factors complicating a judgment on the results of treatment appears to be the site of the wound, independently of the influence of sepsis or gangrene. It has been noted by us that a fatal issue is more common when the body, as distinguished from the limbs, has been wounded. Thus, as will be seen in Table II., out of 115 fatal cases, 61, or 53 per cent., were cases in which the

TABLE II.—*The Position of the Wounds in Reference to the Mortality.*

—	Body.	Limbs.
Fatal: 115 cases ... ... ... ...	61 (53%)	54 (47%)
Recovered: 42 cases ... ... ... ...	18 (43%)	24 (57%)

Note.—When wounds occurred both on the body and the limbs the case is counted only under the heading "body."

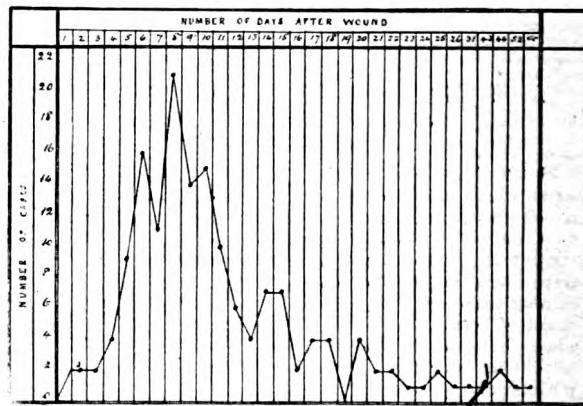
wound or some of the wounds involved the head or trunk, the balance of 54 cases, or 47 per cent., being wounds of a limb or limbs. On the other hand, of 42 cases which recovered 18, or 43 per cent., were wounds of the body, the remaining 24 recoveries, 57 per cent. of the whole, having received wounds of the legs or arms only. The difference in these figures, though not very marked, appears suggestive, and the heavier mortality of the body cases may not improbably be related to the shorter distance which the toxin has to travel in order to reach the spinal cord and the nervous centres.

#### THE INCUBATION PERIOD.

The interval which elapsed between the wound and the first evidences of tetanus was recorded in 157 cases and a curve has been constructed, similar to that in Sir David Bruce's papers, that the experience in France may be contrasted with that at home. The average incubation period of all the cases was 12·03 days. Of the fatal cases, 115 in number, the average period was 10·7 days, and of the 42 recoveries it was 14·4 days. This confirms once again the general experience that the shorter the interval between the wound and the attack the poorer the chance of the patient. At the same time, this difference is less marked than might have been expected, being only a fraction above three days, and it corresponds closely to the figures reported by one of us earlier in the war, where the difference was even smaller, 2·74 days. Comparing our curve of the incubation periods with that of the home cases they appear very similar, except that the peak of the curve in France is reached at an earlier day than in England, the eighth as contrasted with the eleventh. This is only what might have been anticipated as a larger proportion of the early and the acute cases fall to us. The shortest incubation period mentioned—two days—occurred in two instances, but in one of these there was an element of doubt as to the exact day of wounding. The other was a slight case which recovered, the presumed source of infection having been a small cut on the index

finger. On the other hand, cases of latent or delayed tetanus are naturally more common in home hospitals, the two in our list with the longest recorded intervals after wounding being, respectively, 52 days and 90 days. Each of these was fatal; the latter was presumed to have originated from an abrasion of the elbow, and in the case of the former an operation had been performed 11 days before the onset of the symptoms of tetanus.

As regards this interesting subject of delayed tetanus, in which it is to be presumed that spores remain undestroyed in the tissues till they are in some way stimulated to germination, we have 13 cases in our series in which the



Curve of the incubation period.

disease did not make its appearance until 21 days or more had elapsed. This may perhaps be assumed to be the limit of the normal incubation period, although the phrase is an awkward one to employ in the case of a bacterial disease in which the germs are introduced as spores which, theoretically, may lie dormant but living in the tissues for an indefinite time. Of these 13 cases, 8 died and 5 recovered. The figures are small, but the recovery rate in this group compares favourably with that of the whole series. The average incubation period of the 8 fatal cases was 36·3 days and that of the 5 recovered cases 29·4 days.

#### INFLUENCE OF OPERATION BEFORE THE ONSET OF TETANUS.

Table III. shows a list of the 34 cases in which operative interference of a grave nature had been resorted to prior to the development of the first symptoms of tetanus. Of these 34 cases 26, or 76·5 per cent., died, while 8 recovered, a recovery rate of 23·5 per cent. In 4 cases the onset of the tetanus occurred on the day following the operation and in another 4 cases on the second day after operation. In three instances the initial prophylactic subcutaneous dose had been repeated, in two of them 500 units being given a week after the first one. The third case received a second 500 units 4 days after the first and 1500 units 11 days later, on the day of the operation. Of these 3 cases 2 died and 1 recovered, but in the two fatal cases death was not considered as being primarily due to tetanus. The case which had received the three prophylactic doses died, but death was considered to have been due to sepsis and inanition; there had been no convulsions for 6 days before death. Out of 9 cases where death occurred within 3 days of operation 7 were amputation cases; in the 2 remaining ones the wounds and the operations involved the thorax. On the other hand, out of 8 recoveries 3 only were amputations, and only in one case was the thorax involved.

It may be noted that 34 out of our 160 cases fall to be described in this category, as contrasted with the 15 cases out of a total of 195 shown on Sir David Bruce's last communication. This disproportion is readily understandable as these grave operations are naturally demanded more often, and at an earlier moment, in France than in the case of wounded men whose condition was considered such that they could bear the journey to England without undue risk.

#### INFLUENCE OF OPERATION AFTER THE ONSET OF TETANUS.

The practice of operating after tetanus has declared itself appears to be dying out in France. Table IV. deals with only 9 such cases, and no case of this nature has been reported to us since the end of September. Of the 9 cases 7 died and

2 recovered, a case mortality of 77·7 per cent. Of the 2 cases which were most quickly fatal—viz., 1 day and 1½ days—it may again be remarked that each was a body wound; the operations apparently involved much manipulation and may thus have opened up fresh channels

TABLE III.—Occurrence of Tetanus after Operative Interference with the Wound.

No. of case.	Onset of tetanus.		Nature of wound.	Nature of operation.	Recovered or died.	Duration of disease in days.
	Days after wound.	Days after operation.				
J. 13	8	1	Leg.	Supracondylar amp.	D	1
J. 15	11	7	Back, face, hands, thigh, legs (bomb).	Incisions. Removal of necrotic tissue.	D	19
J. 21	8	5	L. thigh, large flesh wound; frac. femur.	Amp. middle thigh.	D	1
J. 22	18	11	Penetrating chest, L.; empyema.	Resection.	D	7
J. 23	6	3	Shrapnel wd. R. arm and fingers, L. arm, both legs, and buttocks.	Exploration and drainage.	D	4
J. 25	21	9	Scalp, finger, thigh, R. arm and elbow.	Ligation brachial for sec. haemorrhage.	D	7
J. 26	8	2	L. shoulder, R. thigh, L. forearm. Severe flesh wounds.	Amp. at shoulder-joint.	D	2
J. 30	12	10	Chest, Back.	Amp. at shoulder.	R	—
A. 11	14	4	L. thigh and leg. Fracture. R. leg lacerated.	Drainage of empyema. Amp. L. leg above knee. Free excision of muscle.	D	5
A. 23	9	3	Post. thoracic. Haemothorax L.	Aspiration.	D	2
A. 24	10	2	Dorsum foot, involving bones.	Excision and removal of bone (1); amputation (2).	D	1
A. 26	15	12.1	G.s.w. chest, penetrating lung.	Extraction of F.B. chest.	D	4
A. 27	12	8	Frac. femur into knee-joint.	Excision and drainage of joint.	R	—
A. 35	35	32	Penetrating chest.	Resection for empyema.	R	—
S. 1	6	2	Cmpd. fract. of forearm R. shoulder, upper arm	Cleansing of arm wound	D	6
S. 7	14	11.5	G.s.w. L. leg. Post, and outer aspect.	Excision and drainage. 1. Removal of F.B.; drainage. 2. Knee-joint reopened.	D	6
S. 14	8	5	L. leg shot away below knee-joint. R. leg and ankle also wounded.	Amputation.	D	3
S. 18	52	11	Cmpd. fract. L. humerus	Amp. for severe sec. haemorrhage.	D	4
S. 24	8	1	G.s.w. L. hand.	Amputation.	D	3
S. 44	12	6	Lower part of back, non-penetrating; also wound neck.	F.B. removed neck (2).	D	4
S. 47	21	16	R. leg, L. thigh, R. arm, several back.	Amp. R. thigh.	R	—
O. 3	15	12.6	Shell wd. R. buttock. F.B. lodged in ileum.	1. Excision. 2. Removal of F.B.	D	13
O. 10	26	23	L. leg, thigh, and foot; frac. tibia and metatarsal. F.B. in cornea.	Amp. thigh, upper third.	D	2
O. 11	17	16.8	G.s.w. both legs.	1. Amp. upper 3rd L. thigh. 2. Opening up of stump.	D	13
O. 19	11	6	G.s.w. head, L. temporo-maxillary joint.	Trehpine. 1. F.B. removed.	R	—
O. 20	3	0	G.s.w. R. thigh.	Opened up.	R	—
O. 22	7	4.2.1	G.s.w. L. chest.	1. Aspiration. 2. Ditto. 3. Rib resection.	D	2
O. 24	25	10	Both legs, R. knee and abdominal wall.	Drainage.	D	9
O. 29	18	14.10	Cmpd. fract. L. upper arm.	1. Cleansing, drainage. 2. R. arm incisions. L. arm disarticulation at shoulder.	D	11
O. 31	6	4.2	Cmpd. fract. L. ulna, two large dirty wds. Two large dirty wds. L. calf.	1. F.B. removed. 2. Cleansing. Removal F.B.	D	4
O. 35	43	36	Penetrating R. thigh. Commin. frac. femur.	Post. wound enlarged for drainage.	D	11
O. 41	44	9	Cmpd. fract. leg.	Amp. below knee.	R	—
O. 43	9	4	Large, over R. scalp. Small, over R. lat. dorsi.	Incision. Drainage.	R	—

for the absorption of toxin by a short route. Among the 7 deaths there were 3 amputations, but, on the other hand, both of the recoveries were also amputation cases.

The figures dealt with in these two tables III. and IV. are too small to throw fresh light on a side of the problem which has been much discussed, but we have no doubt as to the wisdom of giving a sufficient prophylactic dose a short

time before a contemplated operation, and we believe that it is generally agreed to be wise to refrain from any avoidable disturbance of the wound, or anything in the nature of a severe operation, once tetanus has declared itself, at least

TABLE IV.—Operative Interference after Appearance of Tetanus.

No. of case.	Onset of tetanus.	Days before operation.	Nature of wound.	Nature of operation.	Recovered or died.	Duration of disease in days.
J. 4	0		G.s.w. R. shoulder, frac. scap.	Incision, cleansing.	D	1½
J. 7	0		Shell wound R. thigh, frac. femur.	Amp. on appearance of symptoms.	D	(?)*
J. 10	1		Perf. L. leg above ankle.	Amputation.	R	—
J. 11	1		L. knee-joint.	Amputation.	D	(?)*
J. 16	0		G.s.w. R. upper arm.	Incision, drainage.	D	3
J. 29	2		G.s.w. L. foot.	Amputation through calf.	R	—
A. 31	3		Thigh.	Removal F.B. and drainage.	D	8
S. 3	0		Near R. ant. sup. spine, frac. of ilium.	Free opening up of wound.	D	1
S. 5	3		R. tibia compd. frac., wounds R. leg and perineum.	Femoral artery tied.	D	5

\* Not stated.

until there is some sign of abatement of the symptoms and until a sufficient amount of antitoxin has been administered. The latter question will be mentioned again below.

#### THE PROPHYLACTIC USE OF TETANUS ANTITOXIN.

Although, as has been said, the influence of this upon the general incidence of tetanus in the wounded must be left on one side, there remain some points in connexion with it which are of interest and may be discussed without indiscretion.

It is, of course, well known that the earlier the preventive dose is given after the receipt of the wound the more likely is it to be of use. At the same time there is little positive information as to the effects of delay. An effort was therefore made to obtain precise details as to the number of hours which had elapsed between wound and injection. This was obtained in a considerable proportion of the 160 cases—viz., 66. It would have been easy to group for analysis a still larger number than this if one had been content to include cases in which the replies gave one a reasonable certainty that the dose had been given within 24 hours, but only those have been accepted in which a definite statement was forthcoming as to the fact of inoculation, the dosage, and the number of hours after the wound at which the dose was given.

Of the 43 cases which received within 24 hours a preventive dose of 500 or more units—less is never given—62·7 per cent. were fatal and 37·2 recovered. On the other hand, of 23 cases in which the giving of the antitoxin was, for one reason or another, delayed beyond 24 hours, 86·9 per cent. died and only 13 per cent. recovered. These figures are given for what they are worth, and it should be borne in mind that delay in giving the preventive inoculation is almost always caused by the impossibility of removing the wounded man from the place where he was hit till military conditions permitted. Such cases are therefore specially liable to gangrene and to the more severe forms of septic trouble.

These 66 cases are further analysed in Table V. to see whether there was any noticeable correlation between the time of administration of the preventive dose, the average size of this dose and the length of the incubation period. The chief points which emerged from this were that the average incubation period of the recovery cases who got their preventive dose within 24 hours is longer than that of the other classes, and that of those whose dose was delayed, and who yet recovered, the average size of the dose given was large—viz., 915 units.

No prophylactic dose was given in 15 of the cases, and 9 of these died—i.e., 60 per cent. It is to be noted, however, that of the 6 who recovered 5 were instances of men whose injuries, being of the nature of scratches or abrasions, were so slight that they did not report sick, and hence received no dose of serum. Others of those who received

no serum were of that unlucky class who have only been picked up some days after their injury, having lain unfound in some shell-hole or perhaps in such a portion of "No man's

TABLE V.—Correlation between the Amount of Prophylactic Dose given, the Time of Administration, and the Incubation Period.\*

	Interval between wound and prophylactic dose	Number of cases.	Percent-age.	Average prophylactic dose	Average incubation period.
Fatal cases.	Under 24 hours	27	57·4	655 units	10·6 days.
	Over 24 "	20	42·6	585 "	10·5 "
Recovered cases.	Under 24 hours	16	84·3	630 "	14·7 "
	Over 24 "	3	15·7	915 "	11·0 "

\* Incubation period in all cases is reckoned as the interval between the wound and the onset of tetanus, whether there was an intermediate complicating factor, such as an operation, or not.

land" as made it impossible to reach them. Their condition on rescue has sometimes been so critical that the medical officer did not consider it wise to give an inoculation.

#### THE THERAPEUTIC USE OF TETANUS ANTITOXIN.

The "questionnaire" completed in all cases of tetanus was principally designed to obtain accurate information upon the details of antitoxin administration, the number, size, and route of introduction, and the dates of each dose being asked. This information has been given in every case and has formed the subject of close study from as many different points of view as possible. Our thanks are due to the officers who furnished us with these details, collected often under conditions of great stress. Our object, it need hardly be said, was to search the collected results for any indications for or against a particular system of dosage or a particular channel, or combination of channels, of administration of the antitoxin.

Of the 160 cases, all but three, each of them fatal, were treated with antitoxin, so the tables now to be discussed deal with 157 cases.

The number of possible variations in the treatment adopted, as well as the various complications already alluded to, make it a very difficult matter to arrive at clear-cut answers to any given question, and had there been more general agreement on the usefulness of antitoxin in the treatment of declared tetanus and on the best methods of employing it, we should have preferred to wait till more material had become available for analysis. Still, certain points have rather forced themselves upon our notice in our inquiry into the returns, and we believe them to be of sufficient importance to put on record forthwith.

The paper of Sir David Bruce, dealing as it does with a further 175 cases treated with antitoxin in home hospitals, forms a ready means of multiplying experience on certain points, and we shall frequently avail ourselves of the opportunity thus given of comparing our respective experiences and conclusions.

In examining the results of a certain line of treatment we have, as already said, been content to accept as the criterion of success or failure the survival or death of the patient, leaving out of consideration any statement that death was due in the main to some other cause than tetanus.

Table VI. shows the cases distributed in accordance with the total amount of antitoxin which they had received, being arbitrarily divided for this purpose into eight classes. In each group is shown the number of deaths, the case mortality, and the channels of administration by which the serum had been given. As will be seen, there are no fewer than 15 possible combinations of the four routes which we have had under consideration, and there are instances of each of these combinations having been employed. We have taken no account of a few cases in which antitoxin was said to have been given by the mouth or by the rectum, and there has been no report of its local application to the wound. For the sake of brevity we shall in our tables employ an initial letter to signify the particular route; thus "T" = the intrathecal method, "V" = the intravenous, "S" = the subcutaneous, and "M" = the intramuscular. We shall leave the tables largely to speak for themselves, when they have anything to say, confining our comments to such points as appear to us of significance or as needing further explanation or emphasis.

As regards Table VI., the chief point sought was any broad indication of the effects of the total dosage of anti-

toxin. In studying this point we at one time divided our cases accordingly as they had received a total dosage of less or more than 20,000 units. Although we decided later to abandon this method for the succeeding tables as too complicating, we may return to it here as bringing out the

TABLE VI.—Showing the Total Number of Cases Treated by Serum.

Dose (in units).	No. of cases.	Died.	Case mortality.	Methods of administration *														
				T.	V.	S.	M.	T.V.	V.S.	M.S.	T.M.	V.M.	S.M.	T.V.S.	V.M.S.	T.M.S.	T.V.M.	
Below 500	5	4	80%	3	2	—	—	—	—	—	—	—	—	—	—	—	—	
501- 1,000	3	3	100%	2	1	—	—	—	—	—	—	—	—	—	—	—	—	
1,001- 5,000	43	42	85%	12	5	16	2	2	8	2	—	—	—	1	1	1	1	
5,001- 10,000	25	16	64%	6	4	1	3	6	2	—	—	—	1	1	1	1	1	
10,001- 20,000	34	26	76%	2	1	2	1	5	9	5	1	—	—	6	1	1	1	
20,001- 50,000	25	16	64%	—	1	1	—	4	3	2	—	—	10	2	2	2	2	
50,001-100,000	14	6	43%	—	1	1	—	3	1	1	2	—	—	1	1	1	1	
Above 100,000	2	2	100%	—	—	—	—	—	—	—	—	—	—	1	—	—	—	
Totals ...	157	115	73·7	25	7	7	4	14	28	13	4	2	1	26	4	1	5	2

\* T. = Intrathecal. V. = Intravenous. S. = Subcutaneous.

M. = Intramuscular.

The cases are grouped according to the total dosage given, together with the case mortality. The groups are subdivided to show how many cases fall into each one of the 15 possible combinations.

desired point somewhat more clearly. As will be seen, the first five classes, those in which the total dosage had been below 20,000 units, comprise 116 cases, of whom 91 died, a case mortality of 78·4 per cent. The remaining 41 cases received more than 20,000 units, and of them 24 died, a case mortality of 58·5 per cent. There is therefore a balance of 20 per cent. in the favour of the larger dosage. Turning to a somewhat similar table in connexion with the cases treated in home hospitals, and dividing the 175 cases therein analysed into similar groups, below and above a total dosage of 20,000 units, we find that of 108 cases in the small-dose category, 61 died, a case mortality of 56·4 per cent., while of the 67 cases in the large-dose class only 21 died, a case mortality of 31·3 per cent. The balance here in favour of the larger total dosage is 25 per cent., a difference even more pronounced than in our own series.

Taken together, we think there can be little doubt that they demonstrate the better results obtainable from the higher dosage. We have very closely scrutinised our cases to see what influence certain obviously possible fallacies might have had upon this conclusion. For instance, it is possible that relatively small dosage may have been adopted of necessity because the case was rapidly fatal, either from tetanus or a complication; or, on the other hand, the case may have been so slight that the dosage was originally small and was rapidly abandoned. Such cases undoubtedly occur, but against them may be set, unfortunately, the equally certain fallacy that even in severe and prolonged cases the dosage recorded has, in our view, at least, been altogether inadequate, owing to an obvious disbelief in the value of specific treatment. These, and some other disturbing factors, we think tend to cancel one another and we do not consider that they lessen materially the significance of the figures just quoted.

TABLE VII.—Showing the Total Number of Cases Treated by Serum (with or without Non-specific Treatment), together with the Number of Deaths and the Case Mortality. The Table also shows the Number of Cases treated by any one of the Four Available Routes alone or in Combination with One or More of the other Three Routes.

Methods of administration.	No. of cases.	No. of deaths.	Case mortality.	Methods of administration.		No. of cases.	No. of deaths.	Case mortality.
				T.	V.	S.	M.	
			Per cent.					Per cent.
T. ....	25	21	84	S. M. ....	...	1	1	100
V. ....	7	7	100	T. V. S. ....	...	20	17	85
S. ....	27	15	55	T. S. M. ....	...	4	1	25
M. ....	4	3	75	T. V. M. ....	...	5	3	60
T. V. ....	14	11	78	V. S. M. ....	...	1	1	100
T. S. ....	28	21	75	T. V. S. M. ....	...	2	1	50
T. M. ....	13	9	69					
V. S. ....	4	4	100					
V. M. ....	2	0	0					
				Totals ...	157	115	73	

The next table, VII., sets out the cases treated by antitoxin and it shows for each route or combination of routes by which the serum was given, the number of cases, the deaths,

and the case mortality. The uneven size of the groups, and their very number, make evident the futility of any attempt to form conclusions from a consideration of the degree to which the case-mortalities are above or below the mean rate of the whole 157 cases. A better opportunity is afforded by a consideration of the series of Tables VIII., IX., X., and XI., in which the cases are grouped on a different system. Here we have placed together all cases in which one particular route, whether alone or in combination with others, formed part of the system of treatment, a separate table being devoted to each of the four—"T.", "V.", "S.", and "M.". Each of these will now be briefly considered.

Table VIII. deals with the intrathecal route, employed either alone or combined with others. It was used alone in 25 cases, with a mortality of 84 per cent., and this, with the single exception of the combination "T.V.S.", is, it will be noted, the highest rate shown in the table. Looking to Sir David Bruce's figures we see that "T." was used alone in 7 cases, of which 5 died, a mortality of 71·4 per cent., the highest mortality of any group analysed in his paper. So far this does not impress one favourably. Turning to the use of "T." in combination with others, the only other point we shall call attention to is that in each of the four groups

TABLE VIII. shows all Cases Treated by the Intrathecal Route, and TABLE IX. shows all Cases Treated by the Intravenous Route, either Alone or in Combination with One or More of the other Routes, together with the Number of Deaths and the Case Mortality.

Table VIII.—Intrathecal Route. Table IX.—Intravenous Route.

Methods of administration.	No. of cases	No. of deaths	Case mortality	Methods of administration.	No. of cases	No. of deaths	Case mortality
							Per cent.
T....	25	21	84	V. ....	7	7	100
T.V....	14	11	79	V.T. ....	14	11	79
T.S....	28	21	75	V.S. ....	4	4	100
T.M....	13	9	69	V.M. ....	2	0	0
T.V.S....	20	17	85	V.T.S. ....	20	17	85
T.S.M....	4	1	25	V.T.M. ....	5	3	60
T.V.M....	5	3	60	V.S.M. ....	1	1	100
T.V.S.M....	2	1	50	V.T.S.M. ....	2	1	50
Totals....	111	84	75	Totals....	56	44	80

TABLE X. shows all Cases Treated by the Subcutaneous Route and TABLE XI. shows all Cases Treated by the Intramuscular Route, either Alone or in Combination with One or More of the other Routes, together with the Number of Deaths and Case Mortality.

Table X.—Subcutaneous Route.

Table XI.—Intramuscular Route.

Methods of administration.	No. of cases	No. of deaths	Case mortality	Methods of administration.	No. of cases	No. of deaths	Case mortality
							Per cent.
S....	27	15	55	M. ....	4	3	75
S.T....	28	21	75	M.T. ....	13	9	69
S.V....	4	4	100	M.V. ....	2	0	0
S.M....	1	1	100	M.S. ....	1	1	100
S.T.V....	20	17	85	M.T.S. ....	4	1	25
S.T.M....	4	1	25	M.T.V. ....	5	3	60
S.V.M....	1	1	100	M.V.S. ....	1	1	100
S.T.V.M....	2	1	50	M.T.V.S. ....	2	1	50
Totals....	87	61	70	Totals....	32	19	59

showing the lowest mortality the intramuscular route has formed a part of the combination. The moral would appear to be that if one employs the thecal route at all it is better to use it in combination than alone. This is even more strikingly illustrated in the home figures, where the relative death-rates are 71·4 per cent. and 46·7 per cent.

Table IX. deals in a similar way with the intravenous route alone or combined. Of 55 cases in the group 44 died, a mortality of 80 per cent., and we have the striking fact brought out that no case treated by this channel alone recovered. In the home figures the mortality in 7 cases treated by "V." alone was 57 per cent., the second highest in the list. Looking again at the results of the various combinations of "V." with other channels, one again notes that the three lowest mortalities are in groups in which "M." appears.

Table X. shows the subcutaneous route alone and in combination with others. Of 87 cases in which this route

was employed the general case mortality was 70 per cent. When used alone, in 27 cases the mortality was considerably lower, 55 per cent., and here the apparent effect of combining this route with others is bad, except in two particular combinations, into each of which "M." again enters. In the home figures the mortality from cases treated by "S." alone was 50 per cent., but there is no information as to the frequency with which it was employed in combination.

Table XI., the last of this group of four, deals in similar fashion with the intramuscular route. Of 32 cases in which it played a part 19 died, a case mortality of 59 per cent., the lowest figure by 11 per cent. of the four tables. The groups are too small here to afford much information, and, so far as the figures go the mortality resulting from its use alone, 75 per cent., contrasts unfavourably with the mean rate of 59 per cent. This group, however, deals with but 4 cases and may be usefully supplemented by the home figures, which show that of 8 cases treated by this method alone only 1 died, a mortality of 12·5 per cent. Combining these 8 cases with our own 4 we have 4 deaths out of 12 cases, a mortality of 33·3 per cent., which is by far the lowest recorded in either series for the results of a single channel antitoxin treatment.

We fully appreciate the many pitfalls into which one may stumble in searching for truth among small figures dealing with cases presenting so many complicating factors; but, so far, our examination of them has given us some strong impressions, all the stronger in that they were by no means anticipated. They appear to us to throw very considerable doubt upon the advisability of employing the intrathecal route, either alone or in combination, and, further, they seem to indicate considerable virtues in connexion with the employment of the subcutaneous and intramuscular channels, particularly the latter. The evidence for and against the intravenous method also leaves one with a feeling of suspicion, particularly in view of the fact that all of the cases treated by this channel alone died.

#### EFFECTS OF THE DOSAGE OF ANTITOXIN EMPLOYED BY THE SEVERAL ROUTES.

It is obvious, however, that, in considering the results of the various combinations of specific treatment dealt with in the last four Tables VIII., IX., X., and XI. there is a factor of importance which is not disclosed by them, but which it is essential to consider. It is not enough to treat all cases as alike that have received serum treatment by the same combination of routes, we must study the amount and frequency of the dosage by each route if we are to reach a fairer judgment of results. This has accordingly been done, and every individual case has been closely studied from this point of view. A table showing the full details of every dose given in the 157 cases was constructed, but as this would be too elaborate to reproduce we have constructed Tables XII., XIII., XIV., and XV., which, while repeating the classification of cases adopted in Tables VIII., IX., X., and XI., show, in addition, the average amount of antitoxin given by each route in each group of cases. This table enables one to grasp more readily the relative importance to attach to each route in any given combination of routes, and to see how this factor of dosage compares in the cases which recovered and those which died.

Table XII. displays all cases in which the intrathecal route played a part. Contrasting the average dose given by the thecal route in the fatal and recovered cases respectively and in each combination, it will be seen that there is no regularity; in some instances more had been given in the recovered cases, in others less. Looking, then, at the venous fraction, here, too, we see no regularity; a larger dosage by the veins seems in some cases to have been beneficial, in others the reverse. But when we consider the remaining fractions, subcutaneous and intramuscular, in each group into which they enter we notice in all cases that the dosage has been higher, usually much higher, in the recovery cases than in the fatal ones. It should be noted, however, that neither in this nor the succeeding three tables of the series do we attempt to draw any inferences from the two cases in class "T.V.S.M." the employment of all four routes appearing to us to render any attempt of this sort futile.

Table XIII. deals in similar fashion with the intravenous route in all combinations. Analysis in this group is difficult, as in no less than four of the combinations we have

either no deaths or no recoveries, as well as the group "V.T.S.M." of which we take no notice. The two groups most suitable for contrast, on account of the number of cases, are "V.T." where the recovered cases show a larger

TABLE XII. shows Cases Treated by the Intrathecal Method, and  
TABLE XIII. shows Cases Treated by the Intravenous Method,  
either Alone or in Combination with One, Two, or Three other  
Methods. Contrast of the Average Amounts of Antitoxin used  
in the Fatal and Recovery Cases.

Table XII.—Intrathecal  
Method.

Table XIII.—Intravenous  
Method.\*

Method of administration.	Number of fatal cases.	Average amount used by each route.	Number of recoveries.	Average amount used by each route.	Case mortality.	Method of administration.	Number of fatal cases.	Average amount used by each route.	Number of recoveries.	Average amount used by each route.	Case mortality.
T.	21	3,810	4	7,250 <sup>84</sup>	Per cent	V.	7	13,890	0	—	Per cent 100
T.	11	4,470	3	3,000		V.	11	14,345	3	24,000	78
V.	11	14,345	3	24,000	79	T.	11	4,470	3	3,000	78
T.	21	4,060	7	8,000		S.	4	9,875	0	—	100
S.	21	6,950	7	18,000	75	V.	18,000	—	2	24,000	0
T.	9	4,970	4	12,560		M.	0	—	2	24,000	0
M.	9	6,500	4	27,560	69	V.	17	12,535	3	13,500	85
T.	17	6,430	3	3,750		T.	6,430	3	3,750	25,500	85
S.	17	12,535	3	13,500	85	S.	7,985	—	2	24,000	0
T.	1	7,500	3	4,300		V.	15,600	4,170	2	7,500	60
S.	1	3,000	3	6,170	25	T.	3	4,170	2	7,500	60
M.	6,000	11,800	11,800	—	M.	8,330	—	2	24,000	0	
T.	3	4,170	2	7,500		V.	500	—	0	—	100
V.	3	15,500	2	5,250	60	S.	1	1,000	0	—	100
M.	8,330	12,750	12,750	—	M.	3,000	—	0	—	100	
T.	18,000	8,000	—	—	V.	100,000	—	100	14,000	—	—
V.	100,000	14,000	—	—	T.	18,000	—	100	8,000	—	—
S.	1	50,500	1	17,500	50	S.	1	50,500	1	17,500	50
M.	34,000	4,500	—	—	M.	34,000	4,500	—	—	—	—
Totals	84	—	27	75	Totals	44	—	11	80	—	—

TABLE XIV. shows Cases Treated by the Subcutaneous Method and TABLE XV. shows Cases Treated by the Intramuscular Method, either Alone or in Combination with One, Two, or Three other Methods. Contrast of the Average Amounts of Antitoxin Used in the Fatal and Recovery Cases.

Table XIV.—Subcutaneous  
Method.

Table XV.—Intramuscular  
Method.

Method of administration.	Number of fatal cases.	Average amount used by each route.	Number of recoveries.	Average amount used by each route.	Case mortality.	Method of administration.	Number of fatal cases.	Average amount used by each route.	Number of recoveries.	Average amount used by each route.	Case mortality.
S.	15	2,450	12	11,500 <sup>55</sup>	Per cent	M.	3	7,500	1	3,000	Per cent 75
S.	6,950	18,000	7	8,000	75	M.	6,500	4	27,560	69	
T.	21	4,050	7	8,000	75	T.	9	4,970	4	12,560	69
S.	18,000	—	—	—	—	S.	0	—	2	24,000	0
V.	4	9,875	0	—	100	V.	0	—	2	24,000	0
S.	60,000	—	—	—	—	M.	60,000	0	—	—	100
M.	1	60,000	0	—	100	S.	1	60,000	0	—	100
S.	7,895	25,500	3	3,750	85	M.	8,330	2	12,750	60	
T.	17	6,430	3	3,750	85	T.	3	4,170	2	7,500	60
V.	12,535	13,500	—	—	—	S.	15,500	—	2	24,000	0
S.	3,000	6,170	3	4,300	25	M.	6,000	1	11,800	—	—
T.	1	7,500	3	4,300	25	T.	1	7,500	3	4,300	25
M.	6,000	11,800	—	—	—	S.	3,000	6,170	3	4,300	25
S.	1,000	—	0	—	100	M.	3,000	—	0	—	100
V.	1,000	—	0	—	100	S.	1	500	0	—	100
M.	3,000	—	0	—	100	M.	1,000	—	0	—	100
S.	50,500	17,500	—	—	—	V.	34,000	—	4,500	—	—
T.	18,000	8,000	—	—	—	T.	18,000	—	8,000	—	—
V.	1	100,000	1	14,000	50	S.	1	100,000	1	14,000	50
M.	34,000	4,500	—	—	—	M.	50,500	—	17,500	—	—
Totals	61	—	26	70	Totals	19	—	13	59	—	—

venous dose and a smaller thecal one than the fatal cases, and Group "V.T.S.M." in which, while the venous average dose is approximately equal in fatal and recovered cases, we are struck by the fact that in three recoveries only half the

thecal dose was given, but three times the subcutaneous dose, as contrasted with the dosage given in the 17 fatal cases.

Table XIV., dealing with the dosage of the subcutaneous route, alone or combined, brings out more clearly than the others the observation that, in all groups in which we are able to make a comparison between the dosage in the recovered and in the fatal cases, a much higher average dose has been given to the cases which lived. This is particularly noticeable in the group treated by the subcutaneous method alone, where the average dose has been 4½ times higher in the cases which recovered, and in the two other fair-sized groups, "S.T." and "S.T.V.", in which the subcutaneous dose was respectively 2½ and 3½ times greater in the recovery cases. In all, this table impresses us with the value of high dosage when the subcutaneous route is employed.

Table XV., the last of this series, shows the average dose of antitoxin employed in all combinations in which the intramuscular route was used. The various groups in this category are, on the whole, too small to extract from them much guidance in this matter of dosage, but it will be seen that in the largest group, "M.T.", dealing with 13 cases, about four times as much antitoxin was given intramuscularly in the recovered cases as in those which died. In the "M.T.S." cases, in which 3 recovered and 1 died, the intramuscular dose was twice as great in those who lived. On the other hand, in the cases treated by intramuscular injections alone, of which 3 out of 4 were fatal, the only case which recovered received less than half of the average dose given to the fatal cases. On the whole, although the figures are small, we get the same impression here as in the instance of the subcutaneous route—that the apparently favourable effect of employing this channel is associated with a proportionally high dosage.

On regarding these four tables from a general point of view, and without attempting to draw from them more than may reasonably be inferred, we find our suspicions of the thecal and venous routes strengthened, and also some further support for the good impression which has been made on us by a consideration of the results of the subcutaneous and intramuscular routes.

The last table which we shall give, Table XVI., was designed in an attempt to visualise and contrast the results obtained by single-route administration of antitoxin with the results of using that particular route in combination with others.

Looking at the intrathecal results, we see that the case mortality is 10 per cent. higher when this route is used

TABLE XVI.—Comparing and Contrasting the Results Obtained by Each Individually, with those Obtained by that Route in Combination with One or More Others.

	Total cases treated.	Average dosage employed.	Died.		Recovered.	
			Number of cases.	Case mortality	Average dosage.	Number of cases.
Intrathecal route only	25	4,360	21	84%	3,810	4 16%
Intrathecal cmbd. with other routes.	86	5,680	63	73.2%	5,180	23 26.7%
Intravenous route only	7	13,890	7	100%	13,890	0 0 —
Intravenous cmbd. with other routes.	48	16,966	37	77%	15,662	11 23% 23,360
Subcutaneous route only	27	6,470	15	56%	2,450	12 44% 4,500
Subcutaneous cmbd. with other routes	60	11,780	46	77%	10,178	14 23% 17,036
Intramuscular route only	4	6,375	3	75%	7,500	1 25% 3,000
Intramuscular cmbd. with other routes	28	14,650	16	57%	11,655	12 43% 18,640

alone, and also that the total dosage given by the thecal route in the fatal cases was considerably higher in the group in which this channel was employed along with others than when it was employed alone. It was remarked, however, that a considerable proportion of the 21 fatal cases treated by the single-route method were exceptionally severe cases of gunshot injuries. In 9 of them death was

attributed by the reporting officer to causes other than tetanus. Thirteen of them died within 24 hours of the first appearance of tetanic symptoms. Of the recovery cases all were noted as being either slight or localised and none of them reached the stage of trismus.

As regards the intravenous channel, attention has already been directed to the fatal issue in all cases treated by this method alone. The high dosage employed will be remarked, as well as the fact that the average dose given to the recovered cases in whom this channel had been used in combination with others was highest of all. In examining the individual records of the 7 fatal cases treated by the venous route only it was remarked that, although they were all severe wounds, the antitoxin was not persisted in in several, though time allowed for its repetition. In only 2 out of the 7 was the dose above 5000 units.

The subcutaneous route employed alone shows the lowest mortality—viz., 56 per cent. Of the 15 fatal cases 7 were severe wounds, in which death was not attributed directly to the tetanus. The dosage employed in these fatal cases was also remarked upon as being very small, in only one of them was it over 3000 units and most received 1500 units or less. Of the 12 recoveries in the single-route group 6 were either localised or slight, but the dosage only fell below 3000 units in one case, which received 500. The wounds in this group were, on the whole, slight.

Too few cases were treated by the intramuscular route alone to allow of effective contrast with those in which this method was associated with others. Of the 3 fatal cases, 2 were specially severe wounds and the intramuscular dosage was moderate. The recovery case, although severe, was, on the other hand, given 3000 units only. The high average dosage given into the muscles in the 12 recovery cases in the combined group, 18,640 units, is also noteworthy.

#### SUMMARY.

The above analysis of these tables dealing with the therapeutic employment of tetanus antitoxin leaves, we are fully aware, much to be desired, and, at any other time than this, we should have greatly preferred to postpone this article until our material was larger. The importance and urgency of the subject, however, form our justification, and we shall now proceed to summarise the impressions we ourselves have gathered, trusting that we have presented the available facts in such a way that any who wish may do the same.

Our general conclusions would place the alternative channels of administration of the antitoxin in the following order of merit—intramuscular, subcutaneous, intrathecal, and intravenous. Let us consider each separately, emphasising the points of experience or theory which have influenced our judgment. Taking the intravenous route first, as we have placed it last, we are in full agreement with the recommendation of the Tetanus Committee in their revised Memorandum, that this route should not be used; not only does it introduce a risk of anaphylactic shock, from which other methods are practically free, but it appears to us from our records that it has done little, if any, good in treatment. It seems improbable that, even when very large doses are injected into the veins, the antitoxin is likely to be brought to a point at which it is most wanted in a sufficiently concentrated form. Of what is injected only a small fraction can possibly be utilised, and, further, we do not think that the effects of the antiseptic which is mixed with most brands of antitoxin can altogether be neglected when large and repeated doses are injected by this channel.

As to the intrathecal route, we are less inclined to support the recommendation contained in the Memorandum just mentioned when it says: "In a case of tetanus the first thing to do is to give an intrathecal injection of antitoxin." The study of our own cases has not impressed us at all favourably. Sir David Bruce, in his article of Dec. 2nd, considers that the evidence for and against it from his series of cases at home hospitals is not conclusive. We are inclined to go further and consider, from our own tables, and also to some extent from his, that the evidence is pretty strongly against its employment. The theoretical grounds for the adoption of the thecal route are, of course, well known, and depend chiefly on the hope that by bringing antitoxin into more or less close contact with the poisoned nerve cells of the cord we may effect a dissociation between the cell and the molecules of toxin which it has bound to itself. It is known to be very difficult to introduce antitoxin into the cerebro-spinal fluid by means of the blood-stream; hence

the direct path chosen in lumbar puncture. We shall not attempt to analyse the experimental evidence bearing upon this subject, but think it will be agreed that a considerable divergence of opinion still exists as to whether what we aim at, a dissociation of toxin from the poisoned nerve cell, is realisable in practice. The good effect of intrathecal injections of serum in some cases of cerebro-spinal meningitis has really no bearing upon this problem, because, in that instance, we are directly attacking a bacillus which we know to be present in the fluid into which we introduce our anti-serum. Again, in that disease marked benefit often results from the mere evacuation of the turbid fluid which has accumulated under pressure, without even replacing it by an injection of serum.

Apart, however, from doubts as to the soundness of its theoretical basis, the method appears to us to possess some very definite disadvantages and dangers. For example, the dangers of contamination of the needle track, in spite of scrupulous precautions at the time of operation, must be very considerable in certain cases. At all events, definite comments have been made in connexion with some of our cases that thecal injections have been followed by signs of meningeal irritation, and one of us has seen specimens of cords, removed after death from tetanus, in which there was definite evidence of meningitis having followed the lumbar punctures. Again, although Flexner and others have stated that the amount of antiseptic usually added to antitoxin as a preservative is no impediment to its employment by the thecal route, we do not think that repeated injections of carbolic acid, trikresol, &c., can be altogether a negligible consideration in the case of a canal whose limiting membranes are so delicately constituted and their functions so imperfectly understood, to say nothing of possibly adding to the grave irritation already present in the adjoining nerve cells of the motor tract owing to the action of tetanus toxin. In at least one case death followed rapidly upon a thecal dose when the patient was said to have been progressing favourably. It was attributed to anaphylactic shock.

Although we have this decided impression that the intrathecal route may be a dangerous one and do not feel its theoretical foundations to be as secure as one would like, still we have a fair number of instances in which the reporting medical officer was struck with the apparent benefit following a thecal dose, and, of course, as our tables show, it has formed a part of the treatment in 27 cases which recovered.

If it is desired to employ this method we think that its use should be very carefully watched, that exceptional care should be taken to guard against possible contamination of the canal through the needle puncture, that the serum should contain no preservative, and that it is undesirable to withdraw more than 10-15 c.c. of cerebro-spinal fluid or to replace this by a greater volume of antitoxin. It might be advisable to employ for this purpose a solution of desiccated antitoxin, which would be free from preservatives, and could be rapidly prepared under sterile conditions in the desired concentration.

The subcutaneous and intramuscular routes may appropriately be considered together, as they are essentially similar in action, each being a comparatively slow and continuous method of dosage as distinguished from the rapid introduction involved in the venous and thecal methods. While we have expressed our unfavourable impressions in respect of these rapid methods, we have in the present case received a strongly favourable impression, which is confirmed to some extent by the results obtained in the home hospitals. Hitherto these two routes have been looked on as merely supplementary to the others and as being of chief value when it was desired to maintain a moderate concentration of antitoxin in the system after the critical period was past, and with a view to warding off a possible relapse. We think, on grounds both of theory and observation, that they might be promoted to a more dignified position. We believe our records show that when these two paths of introduction have been utilised freely, and where the dosage has been sufficient, the results as regards saving of life have been more satisfactory than when they were not utilised or were used in altogether too restricted a fashion.

Turning to the theoretical aspect, we may follow for a moment the path which the toxin is believed to travel on its way to the central nervous system. It is generally accepted that it travels by way of the motor nerves, though it is still a matter of debate whether it progresses through the axis

cylinders or through the lymphatics which accompany these nerves. At all events, the general blood stream and lymph stream are considered to play but a small part. Once the tetanus spores have found conditions suitable for their germination, and the bacteria themselves are multiplying without interference in some nook or cranny of the wound, the formation of the toxin goes on continuously. It is possible that this toxin at times may accumulate locally and only upon some local disturbance of the wound does it become absorbed in quantity, producing probably a rapid and fulminating attack. At other times the toxin may be slowly but continuously taken up by the nerves, as it is formed, and this may lead to a comparatively slow onset of the disease. In either case we have then to deal with a localised factory of the toxin, which is either continuously or discontinuously absorbed along the nerves. Looking now at the possibilities of neutralising this toxin, we have in our hands a perfect antidote, of that there can be no question, and the problem becomes clear that it is an affair of trying to bring antidote and poison in contact with one another within the shortest time and under the most favourable conditions for neutralisation to take place. The alternative lines of attack are three and no more—the local factory of toxin, the line of transit of the toxin to the central nervous system, and the central nervous system itself. The first would, of course, be the ideal one to select, but, unfortunately, we cannot locate it with precision, and attempts to reach it and to deal with it by surgical measures, or by the local application of various antiseptics or oxidising agents, more often than not end in failure or in a sudden outpouring and absorption of toxin. The last, the central nervous system, is difficult to reach and, at the best, this is an attempt to recapture from the enemy a position which they have already taken and hold in great strength. The method of intrathecal injection aims at such a local assault but depends for its possible success on two assumptions—namely, that the antitoxin shall actually come into contact with the nerve cells which are poisoned and, having come into contact with them, shall be able to neutralise or withdraw from these cells the tetanus toxin which had reached them. In practice the results of this line of attack appear to us, from our own and the home cases, to be most disappointing.

The chances of success by employing the third alternative, an attack on the lines of communication, would appear more hopeful, especially if this could be done by some method which would keep up the antitoxin attack steadily and continuously on the path over which it is probable the toxin must travel. To effect this there appear to be grounds for considering that the subcutaneous and the intramuscular channels offer greater prospects of success than the intravenous method, for the reason that the dose of antitoxin thrown into the veins is immediately diluted by the whole volume of the blood and, subsequently, of the lymph, and by the time any portion of it comes round to the site where it is required it must be very dilute indeed. On the other hand, antitoxin injected beneath the skin or into the muscles is said to be absorbed but slowly, taking, it is stated, 48 hours in the case of the subcutaneous site and 24 in that of muscular. This comparatively slow rate of dispersion of the antitoxin, presumably into the blood or lymph streams, is usually held to be a disadvantage, and it is largely on this account that the more rapid methods of venous or thecal injection have been advocated as more suitable for treatment in the early or acute stages. To us it appears that this slow rate of absorption should rather be counted as a virtue, especially when the inoculations are made somewhere along the supposed path taken by the toxin in its journey from wound to cord. At all events, it seems clear that by these methods we could in a given area produce a zone of tissue bathed in antitoxin in far higher concentration than could be produced in the blood and lymph of the part by means of intravenous injections, except perhaps by immense doses frequently repeated. Further, it is probable that this antitoxin would remain available locally in considerable strength for a number of hours. On the other hand, assuming that antitoxin is absorbed from the muscles with comparative rapidity, this would be a reason for utilising that channel in order to reach the nerve-centres rapidly, through the general circulation, in cases where it was hoped to effect an early dissociation of toxin from these centres.

Should the wound be a single one, and especially if it is on a limb, we believe it would be sound practice to introduce

antitoxin, both subcutaneously and intramuscularly, somewhere astride the path which the toxin must travel on its way to the spinal cord. To do this effectually it would appear, if our ideas are correct, better to divide the dose and inject portions on each surface of the limb and also at different depths amid the muscles. Somewhere among these tissues we know the nerves run along which the poison is travelling, and the more evenly distributed our antitoxin the better would appear the chance that it may attain effective contact with the toxin and achieve our object.

We have already mentioned that the results of these two methods of introducing antitoxin appear, in the present series of cases, to have been better than those of either the intrathecal or the intravenous methods. It may be that they would have been better still if employed alone, and on the lines suggested above.

Turning now to the question of dosage this appears a most difficult matter to judge. Cases recover in which the amount given has been almost ludicrously small, and others have died in spite of enormous doses. It appears to be a question of bringing the antitoxin into effective contact with the toxin. There can be no conceivable benefit in flooding the body fluids with antitoxin if this never reaches the site where it is required, and, on the other hand, quite a small dose might, by acting at the right time and in the right place, do all that was needed. There are obvious limits to the amount which one can inject intrathecally, but none by the other routes. On the whole, while admitting that we have little to guide us in the matter, we think that, if the combined subcutaneous and intramuscular routes be used, the daily dosage for the first few days should not fall below 10,000 units. If it be desired to supplement this by intrathecal injections it would appear wise to limit these to such a number of units as could be contained in 10 or 15 c.c.

We are in full agreement with all that has been said on the necessity for commencing specific treatment at the earliest possible moment and also on maintaining an effective dosage well into convalescence. The present series contained several examples of relapses occurring on the cessation of serum treatment. With regard to the recommendations of the Tetanus Committee as to watch being kept for early signs of tetanus, this is obviously of the first importance. In connexion with the present series of cases we have unfortunately received little fresh information on this point. A statement upon this point is now asked in every case, but so far has brought little to light. Practically the only early sign mentioned has been that of local contractures at or near the wound, and this has usually been followed rapidly by trismus. Some of the signs mentioned by the committee, such as pain in the wound and hardness of the tissues surrounding it, are, we fear, too common in connexion with sepsis, gas infection, &c., to possess as much value here as they might at home.

With the recommendations of the committee on the subject of repeating the initial prophylactic dose of antitoxin every six or seven days as long as there is any reason to fear tetanus, we are, we need hardly add, in the fullest accord. Instructions on this have been circulated to all concerned. Again, we agree that a preventive dose should be given prior to any secondary operation. For the reasons given above we think that it would be well to give such a dose by the combined subcutaneous and intramuscular channels, inoculating it at several points around the site of operation and at different depths of muscle on its proximal side. If time permitted this should be commenced 48 hours before the operation, but if the operation was one of urgency similar injections in the neighbourhood of the operation wound, with perhaps injection into the sheaths of prominent nerves, would appear a wise routine procedure. As far as present knowledge goes, 1500 units would be a suitable amount to give.

#### NON-SPECIFIC TREATMENT.

Although really outside the purpose of the present article, we may conclude with a few remarks on the replies which have reached us in connexion with this subject. Carbolic acid treatment has been almost abandoned, and few retain any faith in it. Its use was recorded in 8 cases, in strengths varying from 1-20 to 1-100. In no instance were any remarks made on its favourable influence upon the progress of the case. Magnesium sulphate also has gone out of favour, only 4 cases having been treated by this in July and 2 in September. The intrathecal route was

most often adopted. Some temporary amelioration of the symptoms and control of spasm was mentioned in 2 cases, but paralysis of the legs, lasting 24 hours, was noted in another.

Sedative drugs have been used in the great majority of cases. In order of frequency these were as follows: Chloral, bromide, morphia, chloroetone, atropine, omnopon, scopolamine, alcohol, chloroform, and paraldehyde. In some cases, though but few, it was noted that one or other of these drugs had been useful in controlling spasm.

Although fully sympathising with the natural desire of the busy reader to find at the end of a paper such as this a series of "conclusions," we have abstained from them, being very conscious that we have much more to learn on every point under discussion. However, we have not hesitated to express our own views on a number of these points as we have dealt with them, and we trust that they may at least serve to rouse further interest in the specific treatment of tetanus, which we believe to be of greatest value, did we but know how to apply it aright.

## MODIFIED TETANUS.

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THERE are two reasons why the subject of tetanus should be of interest at the present moment. In the first place, the disease still occurs amongst the wounded. During the months of July, August, and September, 1916, at the General Hospital we had one case of tetanus in every 600 cases of gunshot wound. And this, of course, does not represent the full liability, for cases have occurred in patients who have been evacuated to England, and possibly at casualty clearing stations also. In the second place, a large proportion of the cases which have been seen recently have been abnormal in character, inasmuch as the muscular spasms have not become general. They have remained localised to the muscles in the neighbourhood of the original wound. Moreover, apart from the restriction of symptoms to the muscles in the vicinity of the wound, there are certain other characters which differentiate local or modified tetanus from the natural variety. These will receive attention later. In the meantime it may be remarked that in local or modified tetanus we have a new form of disease. The earliest record of a case<sup>1</sup> is now little more than three years old. The disease is new because its cause is new, for local tetanus is tetanus modified by the prophylactic use of anti-tetanus serum.

*Forms of modified tetanus.*—Cases of modified tetanus may be considered in three groups<sup>2</sup>—namely: (1) splanchnic tetanus; (2) cephalic tetanus; (3) local tetanus of the limbs. In all of these forms general spasms with opisthotonus are absent. Cases have been recorded which do not fall into any of these groups—for example, tetanus localised to the abdominal muscles. Nevertheless, these three groups will cover most of the ground and will provide sufficient material for discussion.

### 1. Splanchnic Tetanus.

Splanchnic tetanus<sup>3</sup> follows upon lesions of the viscera—that is to say, penetrating wounds of the abdomen and thorax. It is nearly always fatal and the course is exceedingly rapid, so that death ensues within 24 or 48 hours from the onset of symptoms. Opisthotonus and general convulsions do not occur, the spasms being limited to the muscles of deglutition and respiration. The difficulty in swallowing is a pronounced feature, and may be so severe that the case resembles one of hydrophobia, in which case the sight, or even the mere mention, of a glass of water causes the severest pharyngeal spasm; accompanied usually by acute dyspnoea.

### 2. Cephalic Tetanus.

Of head tetanus there are four varieties: (1) Non-paralytic; (2) the form accompanied by facial paralysis; (3) that accompanied by oculomotor paralysis; and (4) a form in which paralysis of the hypoglossal nerves is a special feature. Of these, the non-paralytic form is said to be the least common,<sup>4</sup> some motor paralysis being the rule in cases of head tetanus. And, as may be expected from its relatively wide distribution, the facial nerve is the nerve that is most commonly affected.

*Head tetanus with facial paralysis.*—This variety follows a wound of the face or its close neighbourhood, and is characterised by: (1) Unilateral trismus, which may become bilateral, and later on (2) difficulty in swallowing; (3) facial paralysis on the same side as the wound. The most remarkable feature is the fact that spasms occur in the paralysed muscles of the face. The explanation of this phenomenon is that there is an alteration in the conductivity of the peripheral branches of the facial nerve, which results in a partial nerve-block, sufficient to prevent the passage of voluntary impulses but insufficient to block the more powerful and pathological impulses of tetanus. The facial paralysis may persist after the other symptoms have disappeared, but ultimately, as a rule, the face recovers.

*Hypoglossal form.*—This form appears to be rare. As a matter of fact, in Major Kazanjian's Jaw Clinic there has never been a case, although the wounds treated there are of the kind in which hypoglossal tetanus might be anticipated.

*Ophthalmoplegic form.*—Ophthalmoplegic tetanus follows wounds of the orbit or its immediate neighbourhood. Ptosis is said to be the commonest symptom, but any or all of the ocular muscles, extrinsic or intrinsic, may be paralysed.

### 3. Local Tetanus of the Limbs.

The last abnormal form of tetanus is that which is limited to one or more of the limbs—that is to say, to one arm, or to one leg, or to both legs. These have been described as the monoplegic and paraplegic types. I do not know whether tetanus limited to the two upper extremities ever occurs. And as regards the simultaneous affection of one arm and one leg—a hemiplegic form—it is difficult to see how this could come about except as the result of simultaneous lesions of these two members.

The chief symptoms of local tetanus are clonic and tonic spasms of the wounded limbs. The clonic spasms have been described in some of the recorded cases as being accompanied by considerable pain, and as lasting for four seconds. As a matter of fact, in the four cases we have had at the General Hospital the clonic movements have been painless and have been mere twitchings, lasting, perhaps, for half a second each. In three out of the four cases these twitchings were the first symptoms to be noticed, while in the fourth case the patient complained that his arm was stiff, and it was found that spasticity and twitchings were both present. In the two cases which survived the twitchings gradually became less frequent with the passage of time, while the spasticity became more pronounced and showed no sign of passing off so long as the patients remained under our observation.

*Tetanic spasticity.*—In the two fatal cases no tonic spasm at all was observed. It is quite possible that in some cases twitchings may not occur, or may escape observation, and the spasticity may then be the only material result of the tetanus. And unless attention be directed to this possibility, it is likely that the true cause of the tetanic spasticity may be overlooked, while in some recorded cases the tonic spasm has preceded the twitchings, and from these facts it is recommended that "persistent hardness in a recently wounded limb should suggest tetanus." The most likely error is to mistake tetanic rigidity for hysterical spasm, which it closely resembles. But in this connexion it is to be noted that tetanic spasticity does not pass off during sleep—at least it did not so pass off in our cases.

There is a special reflex which is indicative of tetanus, and which may be of help in diagnosing certain cases. This reflex consists of extension of the foot and leg when the sole is stimulated, and is in contrast with the normal reflex, which is a withdrawal of the foot from the stimulus. The knee is placed in a position of slight flexion while the stimulus is applied to the sole. There is another sign which Lieutenant B. S. Simmonds has pointed out, and which is elicited as follows: Suppose the leg to be affected; light touches, even the lightest with a wisp of cotton-wool, will produce reflex spasms in that leg. To bring about the spasm by stimulating the thigh, a more vigorous application is necessary; for example, tapping the skin with the fingers. And the further away from the affected part that the stimulus is applied, the more vigorous must it be to evoke reflex spasms. I have thought that respiration of automatic type is an early sign, and believe that it may precede even trismus, and be the first positively recognisable evidence of the onset of tetanus.

*Post-tetanic anaesthesia.*—In the two non-fatal cases of local tetanus of the limbs which we have had at the — General Hospital areas of cutaneous anaesthesia remained. The question arises as to whether this anaesthesia is a consequence of the disease apart from gross trauma of the peripheral nerves. In our cases, the wounds were deep wounds and the cutaneous anaesthesia may have been due to direct injury of a nerve in the wound area. This important point can be cleared up only by further careful observation of cases of local limb tetanus when direct injury of nerves supplying anaesthetic areas can be excluded.

*Notes of Cases.*

The following brief notes on the cases of abnormal tetanus which we have had at the — General Hospital may be of interest. They are six in number, and include one case of splanchnic tetanus, one of head tetanus, and four of tetanus localised to the limbs.

**CASE 1. Splanchnic tetanus.**—The patient was an officer who had been wounded on Sept. 15th in the abdomen. Laparotomy had been performed and some perforations of the small intestines had been sutured. 500 units of antitetanus serum had been administered. We admitted him on Sept. 23rd, when the abdominal wound was cleanly healed. Three days later, 11 days after receipt of the wound, at 5 P.M. he complained of having a stiff jaw. Definite trismus was present and pharyngeal spasm was a pronounced feature. He rapidly became worse and died at 1.30 next morning—that is to say, 8½ hours after the first symptoms had been noted. He had no opisthotonus or general spasms. Death was preceded by unconsciousness and stereotyped breathing.

**CASE 2. Cephalic tetanus.**—The patient was wounded on Sept. 25th by a fragment of shell, which entered his face just above the left temporo-maxillary joint, penetrated the temporal bone, and passed upward into the temporo-sphenoidal lobe of his brain. On admission he had aphasia and weakness of the right upper extremity. On the 30th his skull was opened and the foreign body was extracted. Six days later—that is to say, 11 days after being wounded—tetanus developed. 750

units of antitetanus serum had been given to him at the casualty clearing station shortly after the receipt of his wound. The first symptoms were clonic spasm of the left facial muscles and trismus. On the following day there were added to the facial spasms incessant masticatory movements of the lower jaw and lips, in the course of which his tongue was severely bitten. It was thought—the patient thought so himself—that his tongue took part in the spasmodic movements. Two days later he had left facial paralysis, with spasms of both sides of the face, those on the right side being most vigorous. The left sterno-mastoid had become spasmodic also. On Oct. 22nd, 16 days after the onset of symptoms, the spasms ceased, but left facial paralysis remained.

*Local tetanus of the limbs.*—The four following cases are examples of local tetanus of the limbs:

**CASE 3.**—Patient was wounded in right hip on July 1st. On the 5th the wound was freely opened and a fragment of shell removed. On the 8th, seven days after the wound had been received, twitchings commenced in the right lower limb, and soon involved, though to a lesser extent, the left lower limb. Two days later the patient's pulse became weak, he became unconscious, and died. The twitchings, which were painless, continued up to the time of death, but they remained localised to the lower extremities, and he never had trismus, opisthotonus or spasms, other than those affecting the two lower limbs.

**CASE 4.**—Patient was admitted on July 4th with a gunshot wound of the left knee, penetrating the joint. The knee-joint was septic, and was treated by incisions and fixation. He had been given antitetanus serum before his admission. On July 10th twitching began in the left leg and foot. On the following day the right leg and foot were also involved, and amputation was performed through the left thigh. Three

days later the patient died. Since the amputation the twitchings had continued in the right foot and leg. He never had any trismus or opisthotonus.

**CASE 5.**—An officer had been wounded slightly in the face on July 1st, and had been given antitetanus serum on the following day. He was again wounded by fragments of shell in the calf of the left leg and the left thigh ten days later. On this occasion no serum was given. On the 25th, 14 days after the second wound, the left foot and leg began to twitch. During the spasm there was plantar flexion of the foot, dorsal flexion of the toes, and flexion of the knee. The twitchings were painless. Gradually the affected muscles became spastic, so that a week after the onset they no longer became relaxed between the spasms. The twitchings, as time went by, became less obvious, until they were no longer noticeable, but the tetanic rigidity remained unaltered up to the time of the patient's evacuation to England on Sept. 9th, three months after the receipt of his wound. There was anaesthesia to light touch of the heel and inner side of the foot.

**CASE 6.**—This patient is the subject of the illustrations. (See figures.) He had been wounded on July 23rd in the face and back, where there was an entry wound at the vertebral end of the spine of the right scapula. There was no exit wound. He had been given antitetanus serum on the day following the receipt of his wound. On August 14th, 22 days after being wounded, he complained of stiffness of the right arm, which was then observed to be twitching and to be spastic, with the arm slightly abducted from the trunk and the elbow flexed. The spasm could be overcome by steady traction until the arm was fully extended without causing the patient any pain, but as soon as the traction ceased the arm resumed its spasmodic position. In the course of the next few days the right trapezius and sterno-mastoid were observed to be twitching and to be tonically contracted also, causing elevation of the right shoulder and flexion of the right side of his neck. The twitchings were last noticed on Sept. 6th, but the tetanic rigidity remained undiminished up to the time of the patient's evacuation to England. Throughout there was cutaneous anaesthesia to pin-pricks and light touch over the area of distribution of the fourth cervical nerve.

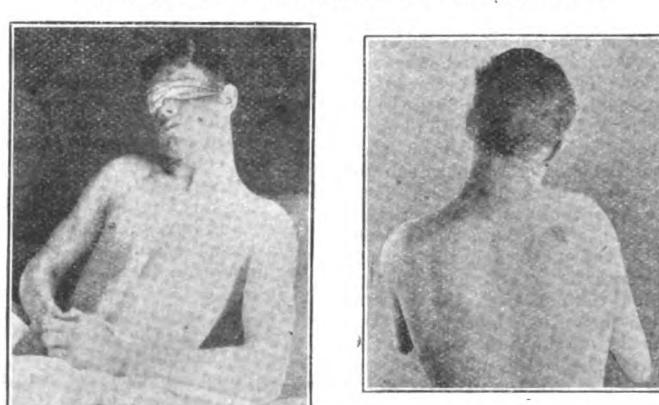
*Incubation period.*—The incubation period in the fatal cases varied from 6 to 11 days, the average being 8 days. In the non-fatal cases the incubation period varied from 11 to 22 days, the average being 16, so that the prognostic significance of a short incubation period appears to be identical in local and general tetanus—that is to say, so far as these few cases indicate.

*Duration.*—The duration of the disease in the cases which recovered, estimated by the period during which twitchings were observed, was between three and four weeks. It is difficult to be more exact, because the twitchings did not suddenly cease; they gradually became less frequent, less easily evoked, and less violent, so that their final disappearance was not a striking event to which a definite date could be affixed. The tonic spasm continued unabated so long as the patients were under our care.

*Mortality.*—The mortality was 50 per cent. This seems a peculiar fact, especially so inasmuch as the patients did not die of exhaustion from general spasm or from respiratory spasm. Presumably they did not die of sepsis in the ordinary sense of the term, for one had a clean amputation stump, and another had a healed abdominal wound, as the only source from which such septic absorption could have been derived. On the whole, it seems probable that the cause of death was tetanus toxæmia, causing a medullary paralysis, though I have not seen any previous reference to this mode of death from tetanus.

*Theoretical Considerations.*

In discussing the subject of local tetanus a great many points of interest will arise. For local tetanus, as has been



Front view.

Back view.

stated already, is a new form of disease. It is tetanus modified by the prophylactic injection of antitetanus serum. And it is the general adoption of this prophylactic treatment that has given us the opportunity to study the conditions. Cases of tetanus beginning locally and followed by trismus and general spasms have long been described, but pure local tetanus is a new thing so far as man is concerned. It is not unknown in animals. In the cat, which is relatively insusceptible to tetanus, a sub-fatal dose of tetanus toxin produces a persistent tonic spasm of the injected limb, and nothing else. And the same is true of the guinea-pig, if the dose of toxin be immediately followed by a sufficient dose of antitoxin. From which facts we may assume that the localisation of tetanus in man, as in the cat and guinea-pig in these experiments, is due to the presence of tetanus antitoxin in the blood.

We have still to consider why, with antitoxin circulating in the blood, there should develop any tetanus at all, and the solution of this question has been provided by experiments on animals. These experiments show that there are two avenues of approach whereby the toxin of tetanus may gain access to the central nervous system. These two avenues are: (1) The general blood stream; (2) the motor nerves. If both these avenues are open general tetanus will ensue. If both are closed, there will be no tetanus. If No. 1 is closed while No. 2 is open, local tetanus will result. Further, the route by the general blood stream is more easily barred than is that by the motor nerves. For toxin circulating in the general blood stream is readily neutralised by antitoxin present in the same medium, whereas the toxin, once it has gained entrance to a motor nerve, is almost insusceptible to the neutralising action of antitoxin. And it has been shown also, that when tetanus toxin is injected into a muscle, its passage into the nerve is rapid, so rapid that it may forestall the antitoxin and bring about local tetanus. Incidentally, it would seem that local tetanus is not likely to occur at all unless there is direct injury of muscle tissue—that is to say, if the hypothesis of causation is correct, local tetanus is unlikely to follow, for example, a wound involving skin and subcutaneous tissue only. Observations on this point are desirable.

Some hold<sup>6</sup> that the peripheral nerves are the sole means of entry of tetanus toxin to the central nervous system, and they explain the absence of generalised tetanus after subcutaneous administration of antitetanus serum as due to immunisation of the higher centres thereby, this immunisation being insufficient to overcome the relatively concentrated attack on the cord at the place of origin of the motor nerves. So far as treatment is concerned, it is immaterial whether this or the foregoing hypothesis is the correct one.

#### *Can Tetanus following Gunshot Wound be Abolished?*

General experience has shown that a great diminution in the occurrence of tetanus has followed the systematic use of antitetanus serum in cases of gunshot wound. There is strong evidence that it can be abolished, provided that two conditions are fulfilled. The two conditions are:—

(1) Firstly, that the initial dose of antitetanus serum is given sufficiently soon after the infliction of the wound. It has been shown that once the toxin has entered the motor nerves, or the central nervous system, it is not readily neutralised by antitoxin, and while we may suppose that tetanus bacilli require a little time to become established in a wound and to produce a material amount of poison, it also requires a certain period of time for antitoxin, injected subcutaneously, to produce much effect. It is stated<sup>7</sup> that with subcutaneous injections of tetanus antitoxin, as with similar injections of antidiphtheritic serum, two days are required for a maximum effect.

(2) The second condition is that the dose must be repeated. Tetanus antitoxin does not persist indefinitely in the blood. It disappears rather rapidly—ten days is given as its average time of endurance—and therefore the dose must be repeated at intervals of a week or thereabout, to ensure the maintenance of a proper amount of antitoxin in the blood. For by injecting antitoxin we do not destroy the tetanus bacilli in a wound. These continue to flourish, and to manufacture their toxin in spite of it, and have been found in a vigorous and virulent condition for as long as six weeks after the wound was received.<sup>8</sup>

*Duration of effect of antitoxin*—Ten days have been given as the period during which a single dose of antitoxin is effective. This, of course, is a general rule only. In the

third case of local tetanus (Case 5) the patient had been given a dose of antitoxin nine days before receiving the wound from which modified tetanus developed, and 23 days before the first symptoms appeared. From which it appears that antitoxin in some cases may remain potent in the blood for more than ten days; potent, that is to say, to prevent general tetanus. Perhaps it may last a great deal longer than this, as the following case seems to indicate.

A man was wounded in the foot in November, 1915, and was given antitetanus serum. On July 2nd, 1916, he received slight wounds in the back of his neck. He remained with his battalion, and no serum was given. On Sept. 14th stiffness of the jaws and difficulty of swallowing developed, for which he was treated at a casualty clearing station. These symptoms lasted for about ten days, and then passed off without the development of any grave consequences. Presumably this was a case of modified tetanus, although eight months had elapsed between the injection of antitetanus serum and the receipt of the second wound, and ten months between the injection and the first appearance of symptoms.

I have not included this among our cases of local tetanus, because the chief symptoms had disappeared by the time that we admitted him.

On the other hand, there is clear evidence that not only local but general tetanus may in some instances follow a gunshot wound, in spite of a single prophylactic dose of antitetanus serum.

We had such a case in 1915, in which general tetanus developed 21 days after a gunshot wound of the forearm, although a prophylactic dose of antitetanus serum had been administered shortly after the receipt of the wound. This patient, an officer, was a chemist in civil life, and was absolutely sure that an initial prophylactic dose of serum had been given to him.

*Site of injection.*—Judging from the knowledge gained by experiments on animals, there seems to be some advantage from injecting the serum in the first instance into the muscles of the wounded limb. This certainly seems to be advisable in cases where, for any reason, delay has come about in giving the initial dose; for example, in the case of a wounded man who has lain out for some days after being wounded.

#### *Treatment of Established Tetanus.*

In a case of established tetanus we must remember that, although the symptoms are local at first, they may become general. And, therefore, for purposes of treatment we cannot always differentiate between local and general tetanus, and we are not likely to be wrong if we assume that the patient is threatened with the greater evil. And this is so, even though it be stated on the patient's field medical card, that antitetanus serum has been given. For the administration of these prophylactic doses is often carried out by others than qualified medical men, a circumstance which is unavoidable, and yet carries with it the possibility of technical error. Moreover, as shown above, general tetanus may sometimes follow in spite of the proved use of prophylactic treatment.

The indications are: 1. To neutralise the toxin which is present in the circulating blood. 2. To neutralise the toxin which is passing into the nerves of the injured part. 3. To neutralise as soon as possible the toxin which has already reached the central nervous system.

Subcutaneous injection is too slow in its action to effect any of these objects, for speed is of urgent importance, and if no time is to be lost at all it will be necessary to employ three methods of introduction—namely, (1) intravenous; (2) intramuscular, i.e., into the muscles of the affected limb; (3) intrathecal. A suitable treatment would be the immediate intravenous injection of 3000 units of antitetanus serum, accompanied by the introduction of similar amounts into the spinal theca and muscles of the affected limb.

#### *Anaphylaxis.*

What dangers are to be feared from anaphylaxis? Personally, I believe that unless precautions are taken there is a real danger—in the case of intravenous injections, at any rate, of causing anaphylactic shock by secondary doses. I believe cases of sudden death to be examples of anaphylactic shock and to indicate that the secondary injection of antitoxin into a vein, in the presence of anaphylaxis, is a dangerous procedure unless certain precautions be taken.

*Recognition of anaphylaxis.*—How can we know if anaphylaxis is present? We can assume its presence if the patient has had a dose of serum ten or more days previously. As to the length of time during which anaphylaxis will continue there seems to be no definite information. Nevertheless, as anaphylaxis is present in some individuals to whom no serum has been administered previously, it is necessary to take special precautions in all cases in which the intravenous route is used for the injection.

By the following method danger from anaphylactic shock is said to be avoided.<sup>9</sup> 5 c.c. of antitoxic serum are diluted with 50 c.c. of warm saline. 1 c.c. of this is run into a vein. 4 minutes later 3 c.c. are run in; 2 minutes later 10 c.c., and 2 minutes later again 25 c.c. are run in, and after a pause of 10 minutes the remainder is injected. After this the intrahecal and intramuscular injections may be made without further special precaution against anaphylactic shock.

For some hours following the performance of intrathecal injection of antitetanus serum, it is necessary, of course, to keep the foot of the patient's bed well raised. We know, from experience with spinal anaesthesia, that fluid injected into the lower portion of the spinal theca will not travel up the cord if the patient's dorsal spine be raised above the level of his lumbar spine. We also know that the fluid will travel up if the foot of the bed be raised. And what is true for a solution of novocain we may assume to be true of a solution of tetanus antitoxin.

Besides the administration of antitetanus serum, other therapeutic measures need consideration. Of drugs, chloral, bromide, and morphia have been the most used. For procuring rest paraldehyde in large doses has seemed of great benefit, and is perhaps more effective than any other drug. In severe cases a watch must be kept for acidosis, which is said to be present, as might be expected, in most of these.<sup>10</sup>

Treatment of the wound also is of importance. The natural impulse is to operate at once in order to eradicate the offensive bacilli, to excise necrotic tissue, to remove foreign bodies, and to provide free drainage; or to amputate the limb, but caution is required here, for experience has shown that operations on wounds infected with tetanus bacilli are likely to bring about a sudden diffusion of toxin, with consequent disaster. And the same is true of amputation, even though the amputation be performed before tetanus has declared itself. Operations, therefore, should be deferred, if possible, in all cases of established tetanus until sufficient time has passed for artificial immunisation to have been effected.

Immobilisation, however, so far as this is possible, is of paramount importance. We know the ill-effect of movement in the case of wounds infected with tuberculosis or the organisms of sepsis, an effect which consists of diffusion of toxins and possibly of bacteria also. A similar effect ensues in the case of wounds infected with the bacilli of tetanus. And not only the wound but the patient also, so far as is possible, must be kept at rest. In general illustration of this point may be quoted a case that we had in 1915.

The patient, an officer, had passed successfully through an attack of general tetanus. After the symptoms had subsided and we regarded him as cured he was evacuated to England. On his arrival there tetanus again developed, and he underwent a second attack, brought on, there is little doubt, by the disturbances of his long journey.

#### Conclusion.

In conclusion, I should like to ask the following open questions:—

1. What cases of modified tetanus have been met with?
2. What have been the special features?
3. Have areas of cutaneous anaesthesia been observed in these cases?
4. Has persistent tetanic rigidity been present?
5. What is the cause of death in fatal cases?
6. Have any cases of anaphylactic shock been observed, and, if so, in what circumstances?
7. Have any cases of sensory tetanus been observed?

Answers to these questions I hope will be forthcoming, and also a great deal of other information on this interesting subject of local tetanus. If we are to understand the condition thoroughly, we must learn about it now, while there are cases available for study. It is to be hoped, therefore, that medical men who have had cases under their care will forthwith publish the details, and so communicate to others the benefit of their own experiences.

*Continued at foot of next column.*

## WEIL'S DISEASE (SPIROCHÆTOSIS ICTERO-HÆMORRHAGICA) IN THE BRITISH ARMY IN FLANDERS.\*

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A SHORT preliminary note<sup>1</sup> on infectious jaundice among British troops in France was written in the early summer of 1916. Although the investigation of this disease is still being pursued both here and elsewhere and is as yet far from complete, the accumulation of considerably more material, both clinical and experimental, since our last publication would seem to justify a further communication at the present moment. The additional results which we have attained contain little not already described by Inada and his collaborators, but they seem of interest in that our confirmation of the findings of the Japanese workers, at the time of our first note only partial, has now been rendered almost complete. The only results which we have not been able to duplicate are their success in growing the causal organism in artificial culture and the finding of spirochaetes in the urine. The possible explanation of the former point and the evident explanation of the latter are discussed below.

#### Previous Work.

The disease commonly bears the name of Weil, who described it in 1886, but Martin and Pettit, in a recent publication discussed below, point out that this is quite unjust in that several French authors, quoted from Kelsch (1894), had previously described the condition under various names, and at dates extending from the siege of Cairo down to 1886. Those quoted are: Larrey, Ozanam (1849), Monneret (1859), Laveran the elder (1865), Lancereaux (1882), Landouzy (1882), and Mathieu (1886).

Weil described the chief characteristics of the disease as being jaundice, pyrexia, and haemorrhages, and the occurrence of cases in epidemics or localised groups. Widespread epidemics have been recorded in the United States, and also outbreaks in India, Africa, and the Near East. In Osler's Medicine we find:—

The symptoms are at first gastric, then fever follows (with the usual concomitants) and jaundice, which may be slight or very intense, and, as a rule, albuminuria. The liver and spleen are often enlarged, and in the severe forms there are nervous symptoms and haemorrhages. There is often a secondary fever, and the attacks last from ten days to three weeks. The course is usually favourable; fatal cases are rare in the United States and in India and South Africa, but in the Greek hospital at Alexandria the death-rate was 32 among 300.

No definite etiology had been established until the subject of infectious jaundice was reopened by a monograph from Drs. Inada, Ido, Oki, Kaneko, and Ito, which was first published in the English language in March, 1916, in the *Journal of Experimental Medicine*. In this paper the authors state:—

In the western part of Japan there prevails an epidemic and endemic disease, characterised by conjunctival congestion, muscular pains, fever, jaundice, haemorrhagic diathesis and albuminuria, which is known as Weil's disease or febrile jaundice. At the end of last year (1914) the same disease was observed in Shiba, in the eastern part of Japan near Tokio, where the patients numbered 178.

\* Received for publication on Dec. 8th, 1916.

<sup>1</sup> Journal of the R.A.M.C., September, 1916, and Brit. Med. Jour., Sept. 23rd, 1916.

*Continued from preceding column.*

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In 1914 Inada and Ito reported the discovery of a spirochæta in the liver of a guinea-pig which had been injected with the blood of a patient suffering from Weil's disease. They reported that they were able to repeat this finding with the blood of other cases, the animals developing albuminuria, pyrexia, and jaundice, and they were able to show the spirochætae in the liver and blood of the animals in large numbers. They were able to pass the infection from animal to animal, and in one strain they had reached 50 passages. The experiments made with the blood of normal people and of patients with catarrhal jaundice produced no such result. Subsequently the Japanese workers were able to demonstrate "the same spirochætae in six specimens of patients' blood, in the intestinal wall of one case, and in the adrenal gland of another case, of 11 autopsied cases." In two cases which came to autopsy on the sixth day of illness they found the spirochætae in the liver in almost as great numbers as in the liver of guinea-pigs. Finally they showed that the blood serum of patients recovering from the disease contained protective substances against the spirochætae.

From these data they came to the justifiable conclusion that the spirochæta which they had found was to be considered the causal organism of the disease. They state that they have, with the blood of 13 out of a series of 17 cases, succeeded in producing the disease in guinea-pigs, the animal showing the typical signs of the disease and the spirochætae being found in the blood and liver. The blood from all cases in which it was taken on the fourth or fifth day of illness gave positive results, but after the fifth day the results became more inconstant as the disease progressed. They indicate that the spirochætae disappear from the blood coincidentally with the appearance of immune substances in the serum. In the early stages the spirochætae were in the blood stream, but as the disease progressed they disappeared from the blood, and the authors were not able to demonstrate them in the tissues. At some period after the tenth day spirochætae appear in the urine and may be demonstrated both by dark-ground illumination and by animal inoculation. They consider the appearance of the spirochætae in the urine to depend on the development of an immune substance in the serum. They have been able to find spirochætae in the urine as late as the thirtieth day.

Weil believed that the entry of the infection was through the alimentary canal, and Inada supports this view. Ido and Oki have noticed that the disease sometimes begins with a local swelling of the lymph glands, and, further, they have been able to communicate the disease to animals by applying infected material to the uninjured skin. This led them to think that there was a possibility of infection occurring through the skin. In support of this view they note that the disease was more frequent in the wet parts of certain mines, and that, the water having been pumped out on their suggestion, no further cases occurred in those particular areas. They also noted that there were more cases in wet mines than in dry, and that men working on the surface did not contract the disease. They think from clinical observation that direct infection from man to man is rare. Without stating their reasons they say that they consider transmission by mosquitoes or by vermin unlikely.

In the *Bulletin de l'Académie de Médecine*, Oct. 10th, 1916, Dr. L. Martin and Dr. A. Pettit have published an interesting note confirming the existence of the disease in the French Army. They have followed two cases in full and succeeded in finding the spirochætae in the urine and in infecting with the urine of patients convalescent from the disease. They further add an important link to the epidemiology of the disease in describing a most interesting case of one of their colleagues, who himself became infected in passing the disease from animal to animal, the circumstances leaving no doubt that the period of incubation was six to eight days.

#### *General Clinical Picture of the Disease.*

Our attention was first called to the disease by a fatal case of jaundice under the care of Captain Flood, R.A.M.C., whose permission we have for mentioning the case.

The man was admitted with a temperature of 105° F. and very deep jaundice. On the evening of admission there was severe epistaxis, which necessitated the plugging of the nares. Haemorrhagic diarrhoea set in, and on the third day after admission the trunk and limbs were covered with

petechiae. Death followed on the next day. Multiple haemorrhages in the pleura, pericardium, and peritoneum were the most striking feature, apart from the extreme jaundice of all the viscera. The bile passages were free and the duodenum normal. This is the only case we have seen in which the generalised haemorrhages occurred in more than trivial degree, and in this case haemorrhagic diarrhoea was apparently the immediate cause of death. At the time there were no guinea-pigs available for inoculation and the tissues from the case were unfortunately lost. An emulsion of the liver and kidney examined by dark-ground illumination revealed no spirochætae.

A second case, also fatal, occurred a few days later; the patient was admitted moribund under the care of Major Young, C.A.M.C., and died within a few hours. The autopsy showed nothing significant with the exception of the extreme jaundice of the viscera and advanced haemorrhagic nephritis. Tissues examined for us by Dr. Laidlaw at Guy's Hospital did not reveal any spirochætae, and this is in accordance with the findings of the Japanese workers who state that it is very difficult to find the spirochætae when the patient dies late in the disease, as happened in this case which terminated on the twelfth day.

Since then about 100 cases have been observed by us, and of these 50 have been under the personal care of one of us (J. A. R.). In 26 cases we have infected animals from the patients. The animals have died or have been killed, and have all shown the characteristic picture of the disease in the animal, and we have been able to find the spirochætae in all of them, either in films or sections of the tissues. Early in our observations we were struck by the occurrence of cases showing a similar clinical picture, but no jaundice, and we have since been able to establish the fact that cases of spirochaetosis occur without external signs of jaundice, which would seem to cast a doubt on the accuracy of the terms epidemic jaundice and spirochaetosis icterohaemorrhagica. We cannot say definitely in how many cases of Weil's disease jaundice occurs as a clinical sign, but we estimate that it does not occur in more than 60 per cent. of cases in the epidemic with which we are dealing.

*The onset.*—The history of onset was strikingly uniform, and the acuteness of the inception of the disease may be judged from the fact that the patients almost invariably were able to date the onset by some simple reference to the duty they were performing at the time. The onset is very commonly heralded by a shivering fit and a feeling of faintness or giddiness. Characteristic early symptoms have been vomiting, headache, and pains in the back and limbs. The patients complain of great weakness and of feeling as if they had been beaten all over, and they are so sensitive to these pains that they are reluctant to move their limbs or to turn over in bed. Pain in the eyes is a frequent early symptom, and there are often vague unlocalised abdominal pains. The onset is generally with fever of a more or less high degree, varying between 103° and 105° F. The limb pains appear to be muscular, but in one case were especially referred to the tibiae. All the patients on admission were very weak and often collapsed, and complained of the early feeling of unsteadiness and inability to stand.

*Alimentary system.*—The tongue is excessively dry, brown in colour, frequently fissured, and there are sores on the lips. Herpes labialis, invariably becoming haemorrhagic, occurred in 42 per cent. of cases. Vomiting in the early stages may be said to be a constant symptom; it often persists for several days, and the vomitus is frequently bilious. A history of blood in the vomitus is occasionally elicited, and streaks of blood have been seen, but as this may have been swallowed from the naso-pharynx it was not noted as a true haematemesis. Appetite, which was lost during the pyrexial period, returned as the jaundice faded. Hiccough occurred in the two most severe cases, one of which terminated fatally.

Except in two cases, in which there was a history of initial diarrhoea, extreme constipation was the rule throughout the acute stage of the disease. The stools were usually bile-stained. One fatal case succumbed to a terminal haemorrhagic diarrhoea, and in one other small traces of blood were observed in the stools. Intestinal haemorrhage may therefore be regarded as exceptional. During the first few days many patients complained of vague abdominal discomfort and pain, but there was never any localised tenderness. Abdominal examination revealed distinct hepatic enlargement in one case without jaundice, but in no other case was the liver palpable. The spleen was not palpable in any case while under observation here.

*Circulatory system.*—The pulse-rate is usually slow in proportion to the temperature, and this holds good even in the cases without jaundice. In one severe case the pulse-rate rose to 120 during the first week. In early convalescence there is a definite diminution in the pulse-rate. Even

In the bad cases the tension and volume are good. Marked diastole was once noted. Except in one case in which the apex beat was for a short time external to the nipple line, there was no clinical evidence of cardiac dilatation.

*Respiratory system.*—There is, as a rule, no evidence of respiratory complications beyond slight bronchitis in the severer cases or haemoptysis. The respiratory rate is sometimes raised during the early stages, but there was never any evidence of consolidation or pleurisy. In 26 per cent. of cases there was blood-tinged expectoration. Both "bright-red" and "rusty" sputa were noted, the latter being the more common. In the two cases in which hiccough was noted a peculiar catch type of inspiration occurred, and in two others there was an expiratory grunt, although no other pneumonic symptoms were present. Epistaxis occurred in 17 per cent. of cases.

*Excretory system.*—Two cases had difficulty in micturition for which there was no obvious cause. The urine of jaundiced cases contains bile in varying quantities. In some the urine is very deeply coloured, in others the colouration is less evident. In some of the cases without jaundice bile has been demonstrable in the urine. Albuminuria was almost a constant accompaniment of the pyrexial period and varied from a "faint trace" to a "considerable amount." Granular tube casts and red blood cells were present in centrifuged specimens. Probably as a result of the fever and vomiting acetone was also demonstrable in the urine of all the graver cases.

*Nervous system.*—Weakness and great prostration are characteristic of the onset of the disease. Headache and generalised pains and stiffness are constant symptoms, and the pains in the back and legs are exceptionally severe, frequently causing sleeplessness. In the graver cases torpor was noticed, and in one fatal case this progressed to the "typhoid state," and was accompanied by rambling delirium, tremors, and muscular twitches. Pruritus, probably due to the jaundice, occurred in three cases. The eyes are painful and show very marked injection of the conjunctiva, and in one case during convalescence there was a pink suffused zone round the sclero-corneal junction, associated with photophobia, and suggesting a definite scleritis. Subconjunctival hemorrhage occurred in one case.

*Lymphatic system.*—There is a slight enlargement of the glands. The pectoral group of the axillary glands are sometimes felt as discrete shotty nodules on the thoracic wall of the axilla. The cervical glands are also enlarged and sometimes tender. The spleen has never been palpable.

*The skin.*—Varying degrees of jaundice are seen. The colour is usually of a lemon-yellow to a deep orange tint, and never approaches the greenish colour of obstructive jaundice. It first appears on the fourth or fifth day of illness, occasionally earlier: it becomes progressively deeper until the ninth or tenth day, and then, as a rule, fades very rapidly. In some cases, however, the colouration is more persistent. Of 47 cases diagnosed as Weil's disease clinically, or by communication of the disease to the animal, 74 per cent. have developed jaundice, and 26 per cent. have not shown any colouration.

Hæmorrhagic herpes labialis, occurring in 45 per cent. of cases, was frequently of very wide extent, in some cases covering the chin and upper part of the neck. In one case the herpes formed a black, confluent eruption which completely surrounded the mouth and invaded the nares; the contrast of the black sores with the brilliant orange colour of the facies, together with the blood-shot eyes, gave the patient an alarmingly morbid appearance. Petechial hæmorrhages, widely distributed over the trunk, were present in association with the jaundice in one of our cases which recovered, and in one fatal case under Captain Flood. Profuse urticaria occurred in one of our cases.

*The fever.*—There is an irregular pyrexia descending by lysis, and ranging for the first week between 100° and 103°. Temperatures of 104° and over are common at the onset. The fever terminates between the tenth and fourteenth days, and is often succeeded by a subnormal temperature for three or four days. In four cases there was a relapse of the pyrexia but not of the other symptoms, but it must be remembered that the cases are evacuated at an early date, as soon as the pyrexial period is passed, and it may be that relapses occur more commonly than would appear from our observations. We insert some typical charts (Nos. I.-IX.) of jaundiced and non-jaundiced cases.

*Differential diagnosis.*—There is seldom any difficulty in distinguishing between Weil's disease and other forms of jaundice. The high pyrexia, prostration, and conjunctival congestion, on the one hand, and the absence of any localising symptoms, on the other hand, exclude catarrhal jaundice, gall-stones, and cholecystitis. Jaundice due to typhoid or paratyphoid infections is to some extent excluded by blood culture, which is usually done on admission. In the early stages, however, before the appearance of the jaundice and in the non-icteric cases the diagnosis is more

difficult. The combination of pyrexia, herpes, and hæmoptysis has not infrequently resulted in the patient being sent to hospital with the diagnosis of pneumonia, while others have been labelled pulmonary tuberculosis, suspected cerebro-spinal meningitis, and "trench fever." Between severe forms of "trench fever" and non-icteric spirochaetosis it is almost impossible to distinguish during the first few days unless the presence of vomiting and albuminuria in the latter and their absence in the former should prove constant.

*Prognosis.*—During the first two months in which we had cases under observation there were two deaths, and though during the following three months four-fifths of the total cases have passed through there have been no further deaths previous to evacuation as convalescent. We have heard of two cases which were evacuated during the pyrexial period and have succumbed elsewhere. On the whole, the prognosis may be said to be favourable even in the more severe cases. The death-rate is, so far as we know, less than 6 per cent.

*Treatment.*—The treatment at present is purely symptomatic. Good nursing, unlimited fluids, alkaline draughts, fruit to eat, and the rectal administration of glucose (6 per cent. solution, 1 pint) once or twice daily to cases with vomiting and acetonuria constitute the main elements of treatment in our series. When possible the patients are nursed in the open air with apparent benefit.

#### Clinical Pathology.

In order to attempt to ascertain if the jaundice was of hæmolytic origin we made daily blood counts in four early cases, the count being done on five successive days from the fifth to the ninth day of illness. We were unable to demonstrate any progressive diminution in the cell count or in the haemoglobin, and the average of the counts was high. Leucocyte counts in the early cases ranged from 9000 to 10,000 cells per c.m.m. Stained films did not show any degeneration forms or polychromatophilia, changes which are easily demonstrated in the infected animal. The coagulation-time was taken by Wright's method and ranged around 3 minutes.

The resistance of the red cells to various concentrations of salt solution was tested, and it was found that in the cases with jaundice the resistance was increased. Hæmalysis began in normal blood in 0·450 per cent. NaCl, and did not commence in patients with jaundice till 0·350 per cent., and was not complete at 0·300 per cent. This was not found to be the case in patients suffering from Weil's disease without jaundice, and by the addition of small traces of bile to normal blood cells it was possible to increase their resistance. The end-point of the hæmalysis was very low, "complete" being reached in 4 cases only at 0·250 per cent., whereas the normal controls were "complete" at 0·300 per cent. Blood cultures for enteric group organisms were made in over 50 cases, and were consistently negative at the end of three days.

We searched diligently in blood films for the spirochaetes, using different methods and staining in different ways. In one case after citrating a large quantity of blood (20 c.c.), and allowing the cells to settle, and then centrifuging the citrated plasma, we found one spirochaete and in confirmation the animal infected with the blood developed jaundice. This blood was taken on the fifth day of the disease. Dr. A. C. Coles examined films from two cases for us by his special method; in one, the films being made on the second day of illness, he was able to find two spirochaetes in six films. In the other case the films were made on the fourth day and no spirochaete could be found. He has included photographs of the two spirochaetes which he found in the set of photographs he has kindly sent us. We attempted to cultivate the spirochaete directly from the blood-stream on several occasions from early cases, but with no success.

*The urine.*—Albuminuria was a constant occurrence in varying degree; some cases showed only a faint trace, and in others there was a considerable quantity. Casts, generally granular, were frequently found, and a few blood cells were almost always present in centrifuged deposits. Bile pigments in the jaundiced cases were present in large amounts; in some of the cases without jaundice bile could be detected and in others it was absent. Acetone in considerable amounts was present in nearly all the severe cases during the pyrexial period. Leucin and tyrosin crystals were not found. We examined the stools of a series of cases for enteric group organisms but were unable to find them.

#### Morbid Anatomy.

Four cases terminated fatally which we were able to observe:—

Pte. M. Duration of disease unknown, died four days after admission with extreme jaundice and severe hæm-

rhages. Skin showed multiple petechiae and very pronounced jaundice of a bright yellow tint. Peritoneum, pericardium, and pleura covered with small bright-red haemorrhages; haemorrhages in the heart muscle and under the endocardium. Heart soft and flabby. Haemorrhages in the substance of the lung. Liver normal in size, colour, and consistency. Spleen small. Kidneys enlarged and swollen, with multiple haemorrhages, and deeply bile-stained. Intestines and bile-passages normal. All the

large polypi at the pyloric end, one of which had apparently been bleeding and looked like a large thrombosed pile. The heart was very soft and flabby. Two small haemorrhages in the mesentery, one in a lymph gland. Duodenum and bile-passages normal. No spirochaetes found in emulsions of liver and kidney by dark-ground illumination.

Pte. E. Died on ninth day. Extreme jaundice of skin, no haemorrhages. Lungs showed many diffuse, ill-defined haemorrhagic areas, 1 to 2 cm. across; they were most

CHART I.

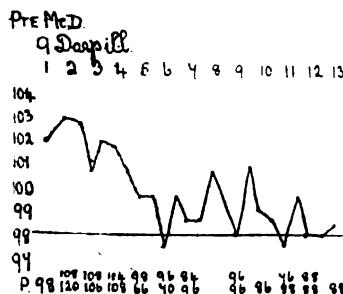


CHART II.

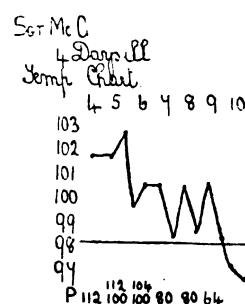


CHART III.

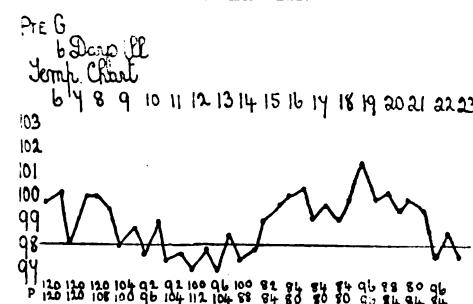


CHART I.—Private McD. Complete chart from first day. History of sudden onset, with shivering, severe pains in head and limbs, jaundice, haemorrhagic herpes, dry, brown tongue; no enlargement of spleen or liver.

CHART II.—Sergeant McC. Very extensive haemorrhagic herpes. Jaundice appeared on fifth day. Diagnosed clinically before jaundice appeared. Temperature chart of animal infected from this patient is given later. (See Chart XIII.)

CHART III.—Private G. Short relapse. Vomiting, jaundice, epistaxis, blood stained sputum, and enlarged glands; hiccup severe, dry mouth and torpor. On the tenth day jaundice began to fade. No return of symptoms, with exception of malaise, with rerudescence of pyrexia.

CHART IV.

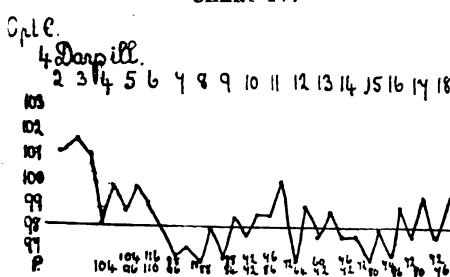


CHART IV.—Corporal C. Chart showing short relapse. Jaundice, herpes, vomiting, epistaxis, albuminuria, acetoneuria.

CHART V.—Private G. No jaundice; clinically diagnosed; intense headache, pains in legs and abdomen; liver slightly enlarged and tender; prostration great, injected eyes, albuminuria.

CHART VI.—Private H. Pains in back and legs, injected eyes, drowsiness; no jaundice. Temperature chart of animal infected from this patient is given in the section on the disease in animals. (See Chart XII.)

CHART V.

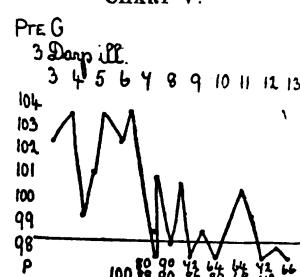


CHART VI.

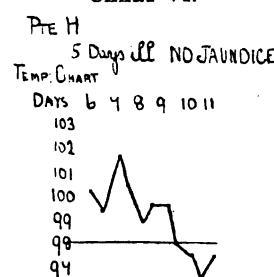


CHART VII.—Corporal McG. Non-jaundiced case. Admitted second day. Severe pains in head, eyes, back, limbs; albuminuria, haemoptysis, vomiting. Chart of animal infected from this patient given later. (See Chart XI.)

CHART VIII.—Private H. Fatal case. Aged 40. Admitted on tenth day with deep jaundice and general malaise, headache, and pains in the legs; onset with vomiting. On admission, conjunctive injected, tongue dry and furrowed; liver and spleen not felt; albuminuria. Twelfth day: Mental confusion, retention of urine, hiccup. Thirteenth day: Rambing delirium, retching, jaundice deeper, pruritus; dyspeptic attack. Fourteenth day: Incontinence of urine and faeces, muscular twitchings. Death supervened.

CHART IX.—Private E. Fatal case. Chart of animal infected from this case is given later. Admitted with jaundice and very ill; unable to give clear account of duration of illness; tongue dry and furrowed, eyes injected, generalized muscular pains; no enlargement of liver or spleen. Patient given alkaline drinks and 1 pint of 6 per cent. glucose per rectum. Next day patient worse; tremors, restlessness, retention of urine, and feeble, intermittent pulse; 1½ pints of 2 per cent. sodium bicarbonate intravenously. Died two hours later, probably on the eighth or ninth day of illness. (See Chart X.)

CHART VII.

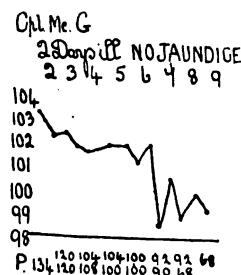


CHART VIII.

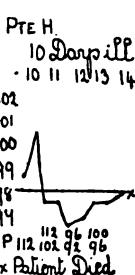
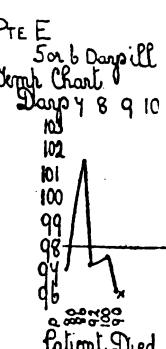


CHART IX.



internal organs, where the colour permitted of its observation, were deeply tinged with bile. No spirochaetes found in liver by dark-ground illumination.

Pte. T. Died on twelfth day. Jaundice somewhat more intense than in the last case. Nothing abnormal noted with the exception of the large, swollen, congested, and haemorrhagic kidneys. Intestines and bile-passages normal. No spirochaetes found in liver or kidney by dark-ground illumination.

Pte. H. Died on fourteenth day. Deep jaundice of skin and all viscera except the brain. Liver normal in size and colour. Spleen small. Kidneys large, swollen, congested, and showing multiple haemorrhages. Stomach had two

evident on the pleural surfaces, but were also well seen on the cut surface. One small haemorrhage in the wall of the left ventricle. Heart soft and dilated with deeply bile-stained endocardium. Liver normal in size and colour. Spleen small. Kidneys swollen, enlarged, and showing multiple haemorrhages. Intestine showed three patches of congestion of the mucosa, one of these in the duodenum. A few enlarged glands in the portal fissure and along the lesser curvature of the stomach. The bile-passages were free.

It will be seen that the haemorrhages, in varying degree, occurred in three of the four cases. An interesting point is that the brain was not bile-stained, though the cerebro-spinal

fluid was bright yellow. The tissues from two fatal cases are available for study; two other fatal cases occurred, but in one instance the tissues were lost and in the other the tissues were sent home for microscopic examination, and we have no sections now in our possession.

*The liver.*—(1) Pte. E. (see Chart IX.); (2) Pte. H. (see Chart VIII.). Both livers showed a certain amount of diffuse granular degeneration, though hardly of significant extent. The most evident anatomical change, as seen in Case 1, is an exudation of polymorphonuclear leucocytes in the interstitial tissue surrounding the smaller bile-ducts. The leucocytes are diffusely scattered and nowhere suggest abscess formation, but around a section of small bile-duct 8 or 10 cells in length there may be seen scattered often as many as 12 or 15 leucocytes. They seem to be more numerous around the smallest interlobular ducts. Leucocytes may also be seen here and there between the liver columns, but nearly always within the blood-vessels. The liver (Case 1) shows a very considerable quantity of bile-pigment, mostly within the cells, in the form of greenish-black rods and granular masses. A difference in quantity between different parts of the lobule could not be definitely demonstrated. Bile-pigment was also found in the blood-vessels and in what we take, after some consideration, to be distended interlobular bile capillaries. These are most evident at the periphery of the lobule, in the neighbourhood of the smaller bile-ducts. Thus, a bile-duct may be seen at its origin from the lobule, surrounded by leucocytes, and just within the lobule at this point there may be seen, lying between adjacent liver cells, three or four spaces up to the size of a liver-cell nucleus, distended with bile-pigment, and apparently converging towards the bile-duct. Case 2 shows considerably less interlobular leucocytic exudate and considerably less bile. There is, however, a moderate amount of light-green pigment filling many cells in the form of fine granules. The structures which we take in Case 1 to be distended bile capillaries are much less evident here, although two or three small circular spaces have been seen, each lying between contiguous liver cells and containing a small amount of pigment. Leucocytes are seen in greater numbers than normal, but diffusely scattered between the liver columns and usually between the vessels. Thus, a row of four or five contiguous leucocytes in a small capillary is not difficult to find. Congestion in neither liver is pronounced.

*The kidney.*—The kidney in each case shows, apart from the acute lesions, a moderately extensive, chronic, diffuse cirrhotic process, rather more pronounced in Case 1. The acute lesions consist in, firstly, swelling and granular degeneration of the tubular epithelium, much more evident in the proximal convoluted tubules and the ascending limbs of Henle's loops. The distribution is diffuse, practically every tubule being involved, so that with most of the tubules the lumen appears to be obliterated. Secondly, a diffuse exudation of polymorphonuclear leucocytes in small numbers, lying between the tubules and more rarely within them. Thirdly, hemorrhage occurring in poorly defined patches usually involving several tubules. The blood is found mostly within the tubules and widely distending them, particularly in the distal convoluted portion. In both cases there was, however, considerable dilatation due to the chronic process, so it is difficult to decide in how far dilatation due to hemorrhage occurred. All these changes were more marked in Case 1, where the degeneration of tubular epithelium was extensive. Glomeruli in neither case showed significant changes.

Sections of other organs showed no important changes, with the exception of the localised hemorrhages in the lungs of Case 1 noted in the gross.

*Spirochete in human tissue.*—Sections of liver, kidney, adrenal gland, and lymph nodes have been prepared by Levaditi's older method and have been thoroughly searched for spirochaete. We failed to find them in all tissues except the kidney of Case 1. In this kidney a small number of characteristic spirochaete were found in isolated areas, so that in an entire section they would be found only in the neighbourhood of one glomerulus, but in considerable numbers at that point. They lie very occasionally between the tubules, but the characteristic place is the epithelium or lumen of a proximal convoluted tubule close to its origin from the glomerulus. Thus in one section of a tubule there may be found as many as 10. Where several occur together in this manner, the majority seem to lie near the centre of the tubule among the granular débris. The tubules in which they are found as a rule show more than the average amount of epithelial degeneration.

#### Experimental Results.

Tables I., II., and III. show the results of the intraperitoneal injection in the guinea-pig of blood of patients clinically diagnosed as Weil's disease. Table I. gives the results from cases showing definite jaundice; Table II. those from cases without evident external jaundice; and Table III. the combined results of the two series.

What we mean by a positive result is that the animal should show the typical signs of the disease, jaundice and hemorrhages, and that we should find the spirochaete in the blood or liver, either in films or in Levaditi preparations of the tissues. We have found, as the Japanese workers did, that the intraperitoneal injection of comparatively small

TABLE I.—*Animals Infected from Cases of Weil's Disease which showed Definite Jaundice.*

Day of disease.	Number of attempts.	Average number of days for death of animal.	Positive.	Negative.	Percent. age.	Day of disease.	Number of attempts.	Average number of days for death of animal.	Positive.	Negative.	Percent. age.
4th	5	10·5	5	—	100	1st*	1	—	—	—	—
5th	7	10·25	4	3	57	2nd	2	—	1	1	50
5th or 6th	2	8·5	2	—	100	3rd	1	9	1	—	100
6th	7	9·75	4	3	57	4th	4	9·5	4	—	100
7th	4	11·5	2	2	50	5th	7	8·5	2	5	28·5
8th	3	—	—	3	—	6th	4	—	1	3	25
9th	2	—	—	2	—	9th	1	—	—	1	—
—	30	—	17	13	56·6	—	20	—	9	11	45

\* No subsequent history of case.

TABLE II.—*Animals infected from Patients Clinically Diagnosed as Weil's Disease without Apparent Jaundice.*

Day of disease.	Number of attempts.	Average number of days for death of animal.	Positive.	Negative.	Percent. age.
1st	1	—	—	1	—
2nd	2	8	1	1	50
3rd	1	9	1	0	100
4th	9	10	9	0	100
5th	14	9·37	6	8	42·8
5th or 6th	2	8·5	2	0	100
6th	11	15·8	5	6	45·4
7th	4	11·5	2	2	50
8th	3	—	—	3	—
9th	3	—	—	3	—
—	50	—	26	24	52

quantities of blood gave the most satisfactory results. Various quantities have been tried, but our experience has led us now to employ as a routine a quantity of approximately 3 c.c. Larger quantities have not yielded better results and have often killed the animal on account of the overdose of foreign blood. We have injected as much as 7 c.c. without killing the animal, but there was severe shock and the result was negative.

#### The Disease in the Guinea-pig.

The disease in the guinea-pig is characterised by pyrexia, jaundice, prostration in varying degree, and hemorrhages in the skin, and in nearly all cases where the disease is allowed to take its course a fatal termination. It will be convenient to consider the findings under separate headings.

*Incubation period.*—The incubation period in guinea-pigs infected with blood from the patient varies within wide limits, and would appear to bear some relationship to the numbers and virulence of the spirochaete in the blood, and possibly also to the presence of immune substances in the blood. The relationship, however, is not always easy to follow, and apparently contradictory results are often obtained. Tables I., II., and III. show the average number of days from injection to death, in animals injected with blood taken on various days of the illness. It is necessary to note that the variation is almost entirely in the incubation period, the duration of the pyrexia being much more constant.

We have not included in the tables one guinea-pig which developed the disease 86 days after injection, although the animal was kept isolated throughout this period. This animal had been relegated to the stud as negative, and developed jaundice after becoming pregnant. Unfortunately, the identity of this animal was not established beyond all doubt, but from various corroborative evidence and the memory of the two men who cared for the animals there was every reason to believe that she was a guinea-pig which had been injected 86 days previously with human blood. The liver showed enormous numbers of spirochaete, many more than usual. The foetuses, about three-quarters term, were removed with the utmost precautions against contamination by maternal blood, and although no spirochaete or lesions typical of the disease could be found in the foetuses, an emulsion of the foetal livers produced the typical disease when injected into a new guinea-pig. The amniotic fluid

was clear and not bile-stained, and no spirochaetes could be found in the placenta, kidney, or lung (unfortunately the liver was lost) stained by Levaditi's method.

In passage animals the incubation period is much shorter and more constant, particularly after the third or fourth passage, and when very virulent strains are used the disease would seem to commence at times within a few hours of the injection of infected material.

*The pyrexia.*—The temperatures are taken morning and evening. As is well known, the temperature of a normal guinea-pig varies within wide limits, and is to some extent dependent on the external temperature. On this account it is often difficult to estimate the significance of a rise of temperature, but a little experience with guinea-pigs infected with this disease enables one to recognise, with few exceptions, the inception of the pyrexia which accompanies the infection. An important point is the comparison of the series of temperatures which are being recorded at the time. The temperature rises, sometimes with sharp spikes, often with only short steps, until the maximum is reached, and then falls sharply before death. The maximum temperature shows great individual variations, and one depends rather on the nature of the curve than on the absolute figure in recognising the pyrexia of infection. We insert four charts which are average examples. Two of these are animals infected from cases not showing jaundice and one is from a fatal jaundiced case. (Charts X.-XIII.)

CHART X.

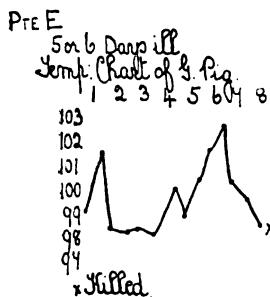


CHART X.—Animal infected from fatal case. (See Chart IX.) Spirochaete demonstrated in Levaditi preparations of liver and kidney.

CHART XI.—Animal infected from non-jaundiced case. (See Chart VII.) Spirochaete demonstrated in Levaditi preparations of liver and kidney.

CHART XII.—Animal infected from case with no jaundice. Spirochaete demonstrated in sections of liver and kidney (Levaditi).

CHART XIII.—Animal infected from case with jaundice. (See Chart II.) Spirochaete demonstrated in sections of liver and kidney (Levaditi).

In 24 guinea-pigs infected with human blood the average maximum temperature was 103° F., and in 53 animals infected with guinea-pig blood or liver (passage strains) it was 102.6° F. It may reach as high as 106° F. or more. The maximum once reached, the fall is very rapid, the downward curve on the chart being in the great majority of cases either a straight line or showing only one or two short steps. The temperature becomes subnormal and the animal dies within a few hours. This is generally 12 to 36 hours after the maximum temperature has been reached.

The duration of pyrexia from the beginning of the rise to the collapse stage is remarkably constant. In 17 of 22 animals infected with human blood this time is between three and four days, and the average for the series is 3.5 days. In passage animals the duration of pyrexia is somewhat shorter, averaging 2.7 days in a series of 38 animals. It is to be noted that with the majority of our infected guinea-pigs we have not waited for death, but have killed them to ensure having fresh material for injection, since in a few cases failure has followed injection of material from guinea-pigs which had died during the night. The animals are not killed until they are moribund, with a subnormal temperature and in a state of extreme collapse. Many animals, however, have been allowed to die, and we have never seen an animal live more than six hours after the stage at which we call them "moribund" was reached.

*Jaundice.*—Jaundice does not appear, as a rule, until the temperature reaches its maximum; that is to say, only a short time before the collapse stage sets in. It is first obvious on the prepuce or labia, then in the sclerotics, and rapidly increases till the skin becomes deeply yellow. In the passage animals, when death supervenes rapidly, the jaundice is never so marked as when the pyrexia period is more prolonged.

*Other symptoms.*—The guinea-pig becomes ill when the temperature begins to rise, but the indisposition becomes more marked as soon as jaundice appears. The fur becomes ruffed, the animal refuses to eat and becomes thin and pinched, and as the temperature falls collapse sets in, with extreme prostration. At this stage the action of the heart is

so weak that it is difficult to obtain blood from the ear veins for blood-counting purposes. Anaemia towards the end, when internal haemorrhages become more extensive, is extreme. A small number of observations would seem to indicate that there is a definite initial leucocytosis. A subsequent progressive fall in the leucocyte count was observed, but the question as to whether this was not more than accounted for by the anaemia has yet to be settled by more thorough investigation of its relation to the red blood cells and haemoglobin.

#### *Pathological Changes in the Guinea-pig.*

The post-mortem appearance in guinea-pigs which have died of the disease or which have been killed during the final collapse is very characteristic.

The skin is deeply and diffusely jaundiced, and jaundice is seen on all internal surfaces where the natural colour permits of its recognition. Numerous fine petechiae are seen in the skin of the flanks and groin, and in the muscle layers of the abdominal wall and subperitoneally. The loose reticular and fatty tissues of the groins and axilla show more extensive and diffuse patches of haemorrhage. Large haemorrhages sometimes occur in the loose retroperitoneal fatty tissue, so that the kidneys, particularly the left, may be more or less completely covered by a thin hemorrhagic layer. The small bowel usually, but not

CHART XI.

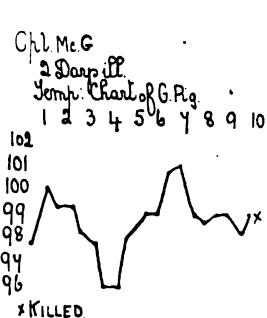


CHART XII.

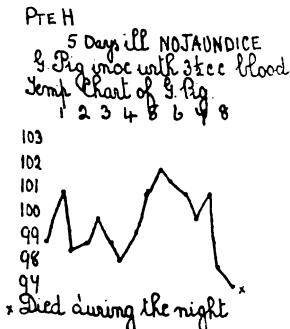
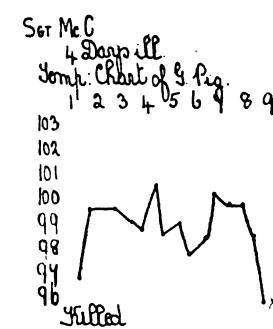


CHART XIII.



always, shows numerous superficial haemorrhages, usually in the form of circular or elliptical patches, 2 to 5 mm. in greatest diameter, and situate opposite the mesenteric attachment. A single injected vessel is seen leading to the patch on each side of the bowel, and the patch itself is often outlined by a fine rim of injected, anastomosing vessels. In animals killed in the early stages of the disease, however, the bowel haemorrhages are seen as minute pin-point spots situated at the side of the bowel at about the point where the encircling vessels commence to divide. These points evidently represent the commencement of the hemorrhagic patch. Hemorrhagic areas are also seen on the large bowel, and, in severe infections, on the stomach. In the latter situation they appear as groups of pin-point petechiae. Enlarged, injected, and often hemorrhagic lymph nodes are seen in the mesentery and in the groins.

The kidneys show very fine pin-point haemorrhages under the capsule and through the cortex on section. The adrenal glands are often seen with such large haemorrhages that all structure is obscure. The liver is more congested and of softer consistency than normal, but otherwise shows no gross changes. The spleen is congested, though not as a rule obviously enlarged. The lungs show the most characteristic gross change, being the seat of multiple, sharply defined haemorrhages of varying size, which contrast sharply with the white lung tissue, giving the striking appearance which the Japanese authors aptly describe as being "like the wings of a mottled butterfly." The haemorrhages vary from 1 mm. to 1 cm. in size, the larger ones being at the bases; when the haemorrhages are numerous they may be seen throughout the lung tissue, but when they are few they are often nearly all subpleural. They may form a strikingly symmetrical double row along the lateral margin of the lower lobe, one row on each side of the sharp margin.

The haemorrhages are an early occurrence in the infection. A guinea-pig killed exactly 24 hours after injection showed well developed lung haemorrhages and beginning bowel haemorrhages. It is to be noted, however, that the strain with which this animal was injected was at this time very

virulent, and a control animal died on the third day. Four or five other guinea-pigs killed at stages from 36 to 72 hours after injection have all showed definite haemorrhages.

#### *Microsopic Pathology.*

**The liver.**—The lesions seen in the guinea-pig's liver are essentially the same as those found in the two human livers—namely, uniform degeneration of liver parenchyma and an exudation of polymorphonuclear leucocytes, more extensive about the smaller bile-ducts. The degeneration varies greatly in degree, in some livers being very extensive, with considerable cell disintegration. As in the human liver, the leucocytes are found both diffusely between the liver column and in localised collections about the bile-ducts, particularly about the smallest ducts at their origin from the bile capillaries. They are also found within the bile-ducts much more commonly than in the human liver. It is to be noted that polymorphonuclear leucocytes are more numerous than normal in the blood, as seen in the vessels of all tissues. No structures which could be interpreted as dilated bile capillaries have been found in the guinea-pig liver; the quantity of bile pigment is much less in the human livers, only occasional cells showing pigment, but these often being packed with it.

After considerable study of both human and guinea-pig livers we are of the opinion that the jaundice is to be ascribed to the inflammatory process noted about the smallest bile-ducts, which probably produces a partial obstruction. If this be so, the condition must in strict terminology be called an obstructive jaundice, the result of a cholangitis or pericholangitis.

**Kidney.**—The lesions here, as in the human kidney, give the picture of an acute exudative nephritis with localised haemorrhages. The degeneration of the tubular epithelium may be very extensive, so that many tubules appear to be completely necrotic. The portions affected are, as in the human, the proximal convoluted tubules and the thicker portions of Henle's loops. Leucocytes occur in varying numbers. In severely affected kidneys they are numerous within and about affected tubules, and often immediately surrounding the glomerular capsule. Tubules are frequently seen distended with masses of leucocytes. Haemorrhages are more discrete than in the human kidneys examined, often being limited, apparently, to individual tubules, the blood lying within the tubule, and in smaller quantity between the coils. A tubule may be seen distended throughout its entire visible length with free blood and thrombus. Tubules are also to be seen distended with homogeneous albuminous exudate. Glomeruli are not markedly affected, although occasionally one may find the tuft pressed back by a mass of thrombus, or still more rarely of leucocytes.

**The lung.**—Under the microscope there are seen, in addition to the haemorrhages noted in the gross, numerous smaller ill-defined haemorrhagic areas. Thus haemorrhages involving only four or five alveoli may be seen. The larger haemorrhages are often limited by the boundaries of the lobule, but may be larger or smaller. They are characteristically pyramidal in section, the base lying against the pleura, which may be raised over a considerable area by a layer of free blood. The vessels leading to the haemorrhagic areas may sometimes be seen to be filled with leucocytes, or, again, a small mass of thrombus may be seen in the vessel, but the evidence is not sufficient definitely to indicate thrombosis as the cause of the haemorrhage. A considerable amount of cellular proliferation may be seen more evident in the alveoli bordering on the haemorrhagic areas. Thus alveoli may be seen packed with large cells of endothelial character. Leucocytes may be seen in small numbers among these cells, or more rarely an alveolus is found filled with leucocytes. The bronchioles show no epithelial changes, but may contain leucocytes and débris.

**The bowel.**—Only one bowel haemorrhage has been examined microscopically up to the present. In this case serial sections were cut through the entire haemorrhage. These show the haemorrhage to be associated with a large mass of lymphoid tissue, evidently, from its size and situation, a Peyer's patch. The haemorrhage surrounds this completely in the form of a fairly thin capsule of free blood and lies entirely within the submucosa. A small amount of free blood is also seen throughout the lymphoid tissue. Through the extended blood run widely distended capillaries, all apparently branches of the same arteriole and venule respectively—that is to say, in all the sections through the haemorrhage only one main arteriole and venule are seen to pierce the bowel wall, and that approximately opposite the centre of the haemorrhage.

**Mesentery.**—In one guinea-pig a small haemorrhage, 1 mm. in diameter, was observed in the mesentery close to the small bowel. This portion of the mesentery was mounted entire, and the haemorrhage was definitely seen to lie around the trunk of a small venule, the associated arteriole being quite free.

**Spleen.**—The spleen shows congestion and endothelial proliferation. The sinuses may be distended with large, clear, phagocytic cells containing red blood cells, leucocytes, or greenish-yellow pigment. Free pigment is also seen. These cells show not infrequent mitoses, and some show several irregular nuclei, or one giant nucleus irregularly lobed. Smaller spherical cells are also seen with a small, thin, crescentic nucleus at one border, the remainder of the cell being filled with packed red blood cells, or more commonly with eosinophilic granules. These cells resemble strongly the "eosinophiles" seen in lymph nodes from cases of Hodgkin's disease.

**Lymph nodes.**—The lymph nodes show congestion and some endothelial proliferation, as seen in the spleen, but, save where haemorrhages occur, no other significant change.

**Adrenal gland.**—In severe cases the adrenal is usually entirely haemorrhagic, the haemorrhage apparently originating in the medulla, and a certain amount of diffuse leucocytic exudation usually occurs.

#### *Spirochaete in the Guinea-pig Tissues.*

The liver of the infected guinea-pig killed at the state of collapse usually shows very large numbers of spirochaetes. They lie mostly along the borders of the liver cells, more commonly at the junction of two cells, or several organisms may surround the cell like a garland, the description which the Japanese workers give. We find them, however, frequently within the cells as well, although Inada and his collaborators say that this is rare, ascribing the fact to the absence of an immune substance in the blood of the guinea-pig. The spirochaetes, in some sections at least, are definitely more numerous at the periphery of the lobule and in the neighbourhood of the smaller bile-ducts. They may be also seen in small numbers in the connective tissue around these small bile-ducts, and not infrequently within the epithelial cells or free in the lumen of the smallest ducts.

In the kidney the distribution of the spirochaetes is characteristically in discrete areas, as noted in the human kidney, so that individual tubules or groups of two or three may show large numbers, the intervening tissue being free. The site is usually within the epithelial cells or free within the lumen of a proximal convoluted tubule close to its glomerulus. Often a mass of many spirochaetes may be seen lying among the granular débris at the centre of a regenerated tubule, and the impression gained is that multiplication has taken place in this situation. Spirochaetes may also be seen occasionally in the intertubular tissue. We have never seen spirochaetes in glomerular tuft or lumen.

We have found spirochaetes in the adrenal gland, lying within the epithelial cells of the capsule. We have also found them in the spleen (fairly numerous), lymph nodes, and in the heart muscle. We have never succeeded in demonstrating them in the lung.

In the blood of the guinea-pig they are fairly numerous, especially in the passage strains where one can find them in films in every third or fourth oil-immersion field. We have never seen them so numerous in the blood as would be expected from the description given by the Japanese authors, and we have not been able to find them with dark-ground illumination in the blood unless it was first haemolyzed with distilled water or saponin and then centrifuged.

The site of multiplication of the spirochaetes has not been determined, but from the numbers found in the liver it may be that it is in that organ that they grow. If multiplication takes place in the blood stream, a possible explanation of the numbers found in the liver, and around the proximal convoluted tubules in the kidney, is the relatively slower circulation at those points.

We have found that the older Levaditi process is the more reliable method of demonstrating the organisms in the tissues; on two occasions pieces of tissue prepared by the pyridin method did not show the organisms, while with the older method they were easily found. For films from the blood or liver we have found Fontana's method the most reliable and rapid, while with Giemsa the time taken for satisfactory staining is often 36 hours, and the organisms are not so distinctive or so easily found. With dark-ground illumination we have been disappointed, although the apparatus we use—a Leitz stage and a small arc lamp—shows *S. pallida* very well. With dark-ground illumination they are much less refractile than *S. pallida* or *S. refringens*. Their movements are slow and undulating, and the most characteristic movement is from side to side at one or both ends, a central portion remaining rigid. A slow spiral movement is occasionally seen. The spirochaetes show pronounced cross striation, caused, apparently, by a uniform series of refractile "beads" and suggesting the appearance seen in striated muscle.

The spirochæta as seen in the living condition or stained is of inconstant shape and has no fixed undulations. The thickness is about that of *S. pallida* or slightly less, and the length varies considerably, being on the average about the length of a specimen of *S. pallida* showing 12 to 14 turns. In films from liver or blood the spirochæta is often nearly straight or shows only wide undulations, while the ends in the majority of organisms are seen recurved like a fish-hook. There is a definite taper to each end from the central thicker portion. In the tissues prepared by Levaditi's method the spirochæta often show angular, irregular undulations, and the tapering at the ends is not so well seen.

We are greatly indebted to Dr. A. C. Coles (Bournemouth) for the photomicrographs which he has kindly taken for us and given us permission to use. They are taken by his special method and illustrate the appearance of the spirochæta in films very well. He has included specimens of *S. pallida* and *S. refringens* for comparison. The photographs of the organisms in the tissues have been done for us by Dr. J. T. Wigham (Trinity College, Dublin) and are also characteristic. We owe our best thanks to these helpers.

#### Technique of Passage.

In the passage of the disease from animal to animal the blood taken from the heart or an ground-up liver is generally successful. We have found, contrary to what Inada states, that the liver emulsion is more reliable than the heart's blood. On three occasions the liver has passed the infection where the blood failed.

The liver is crushed in a mortar and to about 10 gm. of liver is added 5 c.c. of saline, and the whole is briefly centrifuged to throw down particles which could block the needle. The supernatant fluid is then injected intraperitoneally, using about 2 c.c. for each animal.

The injection should be intraperitoneal to be satisfactory, since subcutaneous inoculations give a longer incubation period, and in two or three cases we have seen abscesses or spreading infection of the subcutaneous tissues at the site of subcutaneous injection. Passage has also been performed successfully by spreading liver emulsions on the shaved skin and by feeding the animal on carrot steeped in liver emulsions. We have also passed the infection with the urine of the killed animal. One attempt to infect with the bile failed.

#### Virulence.

The virulence of the spirochæta is very strikingly increased by passage.

The average period from injection to death in 23 animals

infected from human blood was 10 days. The average time

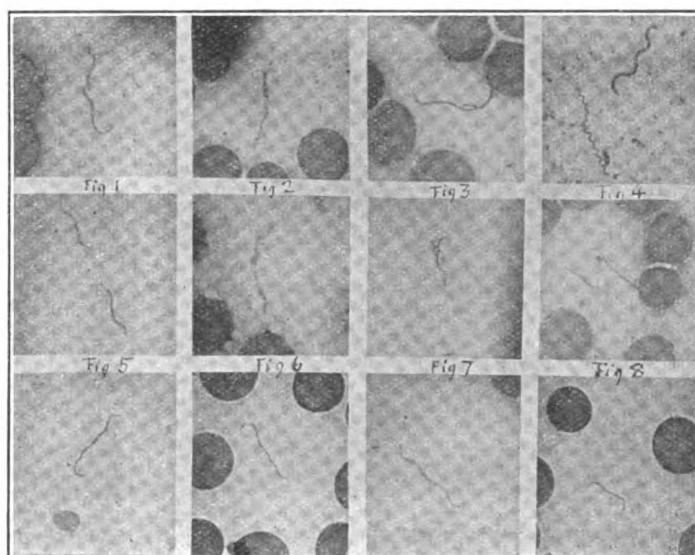
for death in 14 passages of one strain was 4·8 days, and of another strain, for 11 passages, was 5·3 days. This period for the first two or three passages may vary somewhat, but is usually 6 to 8 days; in succeeding passages it becomes progressively shorter and more constant, until a point is reached after 5 or 6 passages at which it becomes approximately fixed at 4 days. With small animals, when the strain is virulent, we have had them die on the third day, but this has always been in half-grown animals. In these young guinea-pigs the infection seemed to be overwhelming. The temperature reaction was slight and the jaundice not well developed. The duration of the pyrexia, as already mentioned, was definitely shorter in passage animals, and this becomes more marked in the later passages.

Jaundice does not have time to develop to the same extent as where the disease is of longer duration. Otherwise the post-mortem appearances show no important difference. The haemorrhages are often more extensive but this is not constant. Another criterion by which the increase in virulence may be judged is the number of spirochæta found in films from the blood and liver. In guinea-pigs dying from infection with human blood one may fail to find them in the blood films after 30 minutes' search of specimens stained by Fontana's method, while the liver films may show them only in 8 or 9 fields. In some animals infected from man we have only succeeded in finding the spirochæta in sections of tissues with Levaditi impregnation. In the animals of the latter passages it is always easy to find the spirochæta in the blood, although they are seldom numerous, but the livers of these animals show large numbers, 10 to 12 spirochæta in every oil-immersion field of a film made from the cut surface of the liver.

#### Experiments with Urine.

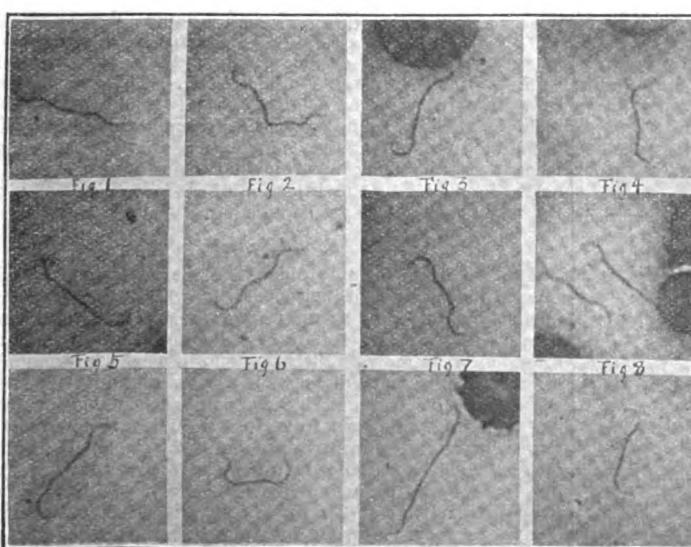
The Japanese authors showed that the spirochæta, both in the experimental disease and the disease in man, were excreted in the urine, the excretion commencing soon after the blood began to develop a demonstrable immunity and continuing in certain cases up to the fortieth day from the onset of illness. They were also able to infect animals with the urine of patients, 3 of 9 inoculations being positive when the injection was done before the tenth day, and 5 of 15 positive when the urine was taken between the eleventh and twenty-first days. They were able to find the spirochæta in the urine with dark ground illumination and regarded the excretion in the urine as a most dangerous source of infection. We have so far failed to find spirochæta in the urine and to infect animals with urine, although we have

#### PLATE I.



Shows 11 examples of *S. ictero-hæmorrhagica* in films of blood from infected guinea-pig. Multiplied 1000 diameters. Stained by Giemsa's stain. 1 example of *S. pallida* and *S. refringens* for comparison. Photomicrographs (I., II., and III.) by Dr. A. C. Coles, Bournemouth.

#### PLATE II.



*S. ictero-hæmorrhagica*.  $\times 1500$ . Various forms from blood of guinea-pig.

repeatedly searched for them and tried various methods of demonstrating them. It must be remembered that the patients were for the most part evacuated at the end of the pyrexial period, tenth to fifteenth day, and it is after this time that the spirochaetae become abundant. We are informed that the spirochaetae have been found with comparative ease at the base hospitals at a later period of the disease. In spite of this we think that our failure to get positive results at the earlier stage of the disease is of some significance, and think it is possibly due to the comparatively benign type of Weil's disease prevalent in this country. We have only in a few cases been able to examine the urine as late as the fifteenth day. We append a list of the experiments.

The animals were inoculated intraperitoneally with the centrifuged deposit from the amount of urine mentioned. They were inoculated with the urine of the same patient on two successive days, and were watched and had their charts kept for 14 days.

G.p. 21	...	...	150 c.c. on 14th and 15th day of illness (Pte. G.)
"	22	...	300 " 10th " 11th " (Pte. H.)
"	23	...	150 " 13th " 14th " (Pte. C.)
"	24	...	150 " 15th " 16th " (Pte. MacD.)
"	43	...	170 " 13th day of illness (Pte. L.)
"	52	...	320 " 13th and 14th day of illness (Pte. B.)
"	64	...	320 " 7th " 8th " (Pte. C.)
"	67	...	300 " 7th " 8th " (Pte. T.)
"	74	...	300 " 6th " 7th " (Gnr. W.)
"	87	...	200 " 11th day of illness (Pte. B.)

The results were consistently negative. In one of the fatal cases there was suppression of urine for 24 hours before death, and we were unable to secure a specimen to inoculate an animal. In the second fatal case which we were able to investigate there were not sufficient animals available at the time to try to infect with the urine.

#### Immunity.

In their first paper on infective jaundice the Japanese authors showed that the blood of convalescent patients contained substances capable of curing infected animals and of protecting them against infection; they dated the appearance of this immune substance at about the tenth day of illness, at which time it first became demonstrable. which we have been allowed to see through the kindness of Dr. Flexner, director of the Rockefeller Institute, they report that they have succeeded in immunising a horse and in using the serum therapeutically with encouraging results. The following experiments were done in confirmation of the original Japanese paper:-

*Experiment 1.*-Guinea-pig 35. The animal developed jaundice eight days after injection, the temperature being on the downward grade after reaching 103° F. The animal was then injected with 2½ c.c. of serum from a patient on the fourteenth day of illness. It showed immediate improvement and began to feed, and the fur became normal; all jaundice was gone on the eleventh day. On the fourteenth day 2 c.c. of liver emulsion rich in spirochaetae was administered and did not infect the animal. This injection was repeated on two subsequent occasions with virulent strains and the animal remained immune.

*Experiment 2.*-Guinea-pig 40. The animal was injected at the same time with 2½ c.c. of serum from a convalescent patient, and 1 c.c. of liver emulsion with 1 c.c. of heart's blood from an animal which had died of jaundice. No symptoms developed for 14 days. A control animal died in 7 days. Guinea-pig 40, reinoculated on the fifteenth day, died four days later with jaundice and typical signs. This would indicate that passive immunity is transient, and that

although the animal was protected by the immune serum, it did not develop any active immunity, since infection had not occurred.

*Experiment 3.*-Guinea-pigs 41 and 47 were subjected to a repetition of Experiment 1, and the result was identical.

*Experiment 4.*-Guinea-pigs 45 and 46 were treated with immune and normal serum respectively when the collapse stage had been reached. Both died within three hours.

*Experiment 5.*-Guinea-pigs 83, 85, 86, 89, and 90 were each injected with the same quantity of virulent liver emulsion, and at the same time human serum was administered as follows:-

Guinea-pig 85.-3½ c.c. normal human serum.

Guinea-pig 83.-2½ c.c. serum from jaundice case taken on sixth day of illness.

Guinea-pig 89.-2½ c.c. of serum from same case taken on eighth day.

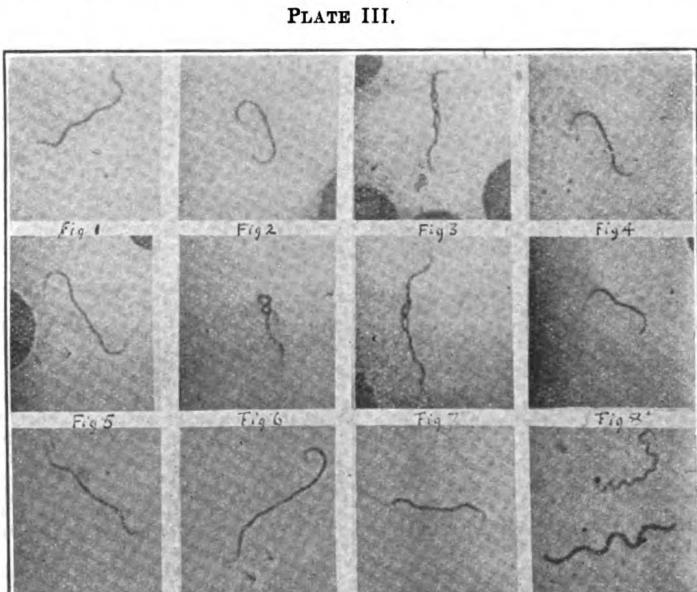
Guinea-pig 86.-2½ c.c. of serum from same case taken on tenth day.

Guinea-pig 90.-2½ c.c. of serum taken from same case on twelfth day.

Guinea-pigs 85 and 83 died on the fifth day with typical signs of the disease. Guinea-pig 89 died immediately after injection. Guinea-pigs 86 and 90 developed no symptoms.

In only one respect do the results of these experiments differ from those obtained by Inada and his assistants, who state that the serum must be given before the appearance of the jaundice in order to cure the animal. We have found that the serum of a convalescent patient will cure the animal even after the appearance of jaundice, if it be given before the collapse stage is reached.

After these experiments had been done we suggested the immunisation of a horse with a view to treatment, but the suggestion was not put into practice, partly owing to the fact that the prevalent type of the disease was relatively benign and did not seem to call for very active treatment. The Japanese workers, in their treatment with serum, succeeded in considerably lowering the death-rate, which was high (32 percent.), but did not shorten the duration of jaundice. They also were apparently able to rid the circulating blood of spirochaetae and to hasten the appearance of the immune reaction in the blood. They found that rather large doses of the horse serum were



Shows examples of *S. ictero-haemorrhagica* in blood films. Nos. 2 and 3 on this plate are *S. ictero-haemorrhagica* from human blood, Corp. MacG. (see Charts VII. and II.). Magnification 1500 diameters. Stained by Geimsa's stain.

In the later paper, the proofs of which we have been allowed to see through the kindness of Dr. Flexner, director of the Rockefeller Institute, they report that they have succeeded in immunising a horse and in using the serum therapeutically with encouraging results.

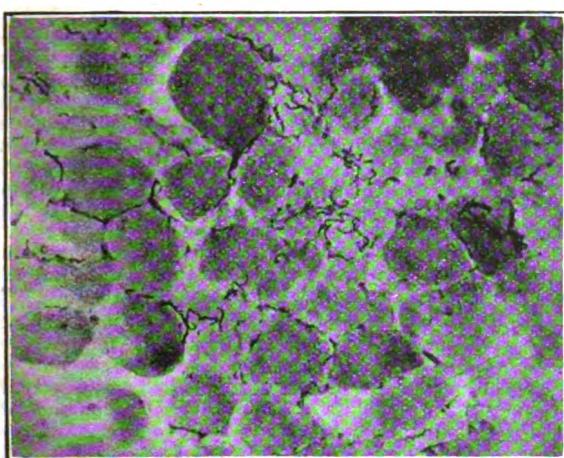
The following experiments were done in confirmation of the original Japanese paper:-

necessary, 60 c.c. or more, and that better results were attained by early administration. This would indicate that a very high titre serum would give better results. They found that the serum which they had prepared was about as potent as that of a convalescent case. They have further attempted to produce active immunity by the injection of carbolised cultures, but the results are not as yet convincing.

#### Sero-diagnosis.

As soon as it became clear that there were considerable numbers of cases of spirochaetosis which did not show obvious jaundice, it seemed to us desirable to find some convenient form of laboratory diagnosis other than the infection of animals. With this end in view a large number of experiments were done with a view of finding whether this could be attained by a complement-deviation test. Antigens were prepared in various ways from the livers of guinea-pigs with very great numbers of spirochaetae, but no test sufficiently reliable could be elaborated. There was nearly always a difference in the haemolysis which held out hopes of arriving at a reliable test, but there was not sufficient constancy. For one instance immune guinea-pigs did not give a positive reaction as compared with normal

FIG. 4.



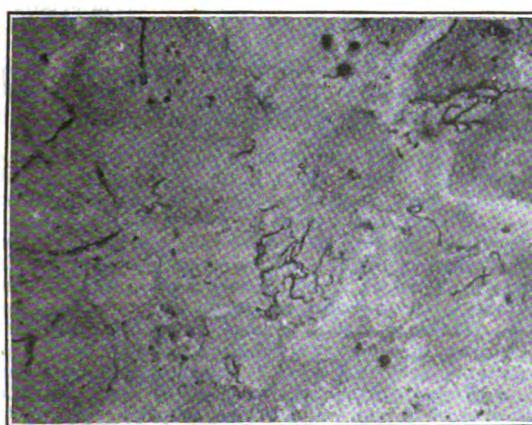
Liver of guinea-pig showing *S. ictero-hemorrhagica*. Sections prepared by Levaditi's first method. Dr. J. T. Wigham.

FIG. 7.



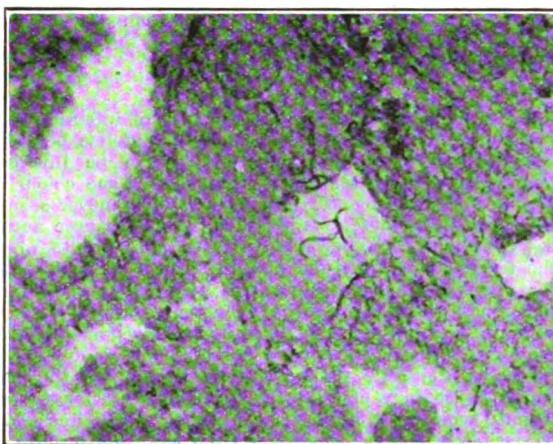
Kidney showing *S. ictero-hemorrhagica* in human tissue. (Pte. E. See Charts IX. and X.). Dr. J. T. Wigham.

FIG. 5.



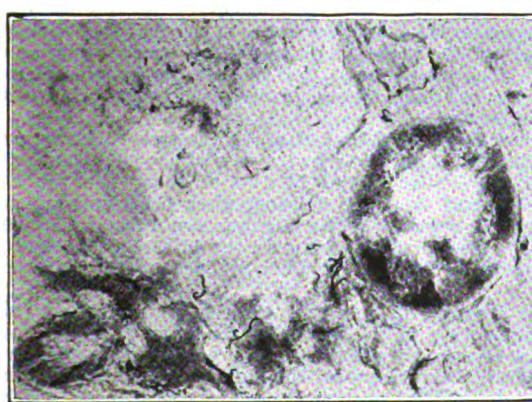
Liver of guinea-pig showing *S. ictero-hemorrhagica* (Levaditi). Dr. P. P. Laidlaw.

FIG. 8.



Liver of guinea-pig showing *S. ictero-hemorrhagica*. Animal infected from case that did not develop jaundice. Dr. J. T. Wigham.

FIG. 6.



Kidney of guinea-pig showing *S. ictero-hemorrhagica* (Levaditi). Dr. P. P. Laidlaw.

FIG. 9.



Kidney from same animal as Fig. 8. Dr. J. T. Wigham.

animals. A further point was that the bile, both in the serum and in the antigen, produced strong anti-complementary action.

#### Cultures.

Inada and Ito succeeded in cultivating the spirochaetae in 1915, and state that they got their original cultures by Noguchi's method.

Ito and his collaborators publish a fuller account of the cultivation of the organism in the *Journal of Experimental Medicine* for April, 1916, and have had no difficulty in cultivating the spirochaetae by taking the heart's blood of an infected animal and growing the blood in deep blood agar or blood gelatin tubes. They state that the cultures begin to grow in 8 days, the maximum being reached in 16 to 20 days. So far as we are concerned, we have been unable to obtain cultures, although we have attempted it repeatedly in different ways and at different temperatures. We tried the original Noguchi technique with guinea-pig liver and kidney as the tissue component, with blood, ascitic fluid, or guinea-pig blood as the enriching medium, and with agar or broth as the basis; in all cases the results were negative. We have tried different infecting agents, blood, liver, or kidney from animals with jaundice, and never succeeded in getting an undoubted culture. Though we have often thought that we could demonstrate the spirochaetae by staining with Fontana's method, we could not see them in such cultures with the dark-ground stage, while, conversely, on one occasion we thought that we had them in culture after examining by the dark-ground stage, but were unable to stain the organism. We attempted several times to cultivate direct from the patient, taking early cases and a relatively large amount of blood into deep agar tubes and covering with paraffin, but these efforts were also abortive.

We mention these negative results as showing that cultivation is not so simple a task as might be supposed from the literature. The possibility of an inherent difference in the organisms is to be considered.

#### Experiments with Lice.

When we began to consider the route of infection in the soldier our first idea was the possibility of lice being the infecting agent, as they may be said to be invariably present on soldiers serving in the field. Some colour was lent to this idea by the fact that we had never seen an officer with true infectious jaundice. The Japanese authors had considered the possibility of fleas and mo-quitos being the intermediate host and discarded both. The fact that the majority of cases came from a relatively small area, that jaundice was rare except in one part of the line, as will be more fully explained later, and that divisions which left the infected area did not have any more cases of jaundice suggested that lice were not responsible. On the other hand, the analogy of relapsing fever made it necessary to attempt some experiments on the matter. The lice seldom survived three days' separation from the human host and seemed not to thrive on guinea-pig blood.

Guinea-pig 88.—40 lice were fed on an animal which had spirochaetae in the blood-stream, demonstrated by films; on the next day the survivors were fed on a fresh animal (Guinea-pig 88), and again on the following day the survivors were fed on this same animal. Result negative.

Guinea-pig 97 and 93.—The same as above.

Guinea-pig 122.—50 lice were allowed to feed on a patient on the fifth day of his illness, and were then fed alternately on the patient and the animal till there were no survivors at the end of 60 hours. Result negative.

Guinea-pig 124.—The same experiment with another patient on the fourth day of illness.

Guinea-pig 123.—100 lice were taken from the clothing of a patient on the sixth day of illness, crushed and emulsified in saline, and injected into the peritoneal cavity of the animal. Result negative.

Guinea-pig 129.—Same experiment as the last with 40 lice. Result negative.

Guinea-pig 125.—Lice taken from the clothing of a patient on the ninth day of illness were fed on the animal till there were no survivors. Result negative.

There is an obvious fallacy in these experiments which is hard to eliminate. The incubation period in the louse may be prolonged and the parasite not become infective for several days, the lice dying, when kept in captivity, before the infective period is reached. Further, the lice taken from a man may not have fed on him while the spirochaetae were abundant in the blood-stream. The experiments, however, so far as they go, bear out what would have been expected from the almost strict area from which the cases came. A large number of lice have also been examined by Sergeant Peacock, R.A.M.C., by staining

methods with a view of finding the spirochaetae. The lice were either taken from men with jaundice or deliberately infected from animals with spirochaetae demonstrable in their blood, and all the examinations were negative.

From every point of view we think that it is improbable that lice are the intermediate hosts if there be an intermediate host in the cycle of infection. We have tried no experiments with mosquitoes, and though the incidence went up as the warm weather set in and has declined with the colder weather, when mosquitoes are scarce, it is not sufficient evidence to incriminate these insects. There were, however, undoubtedly cases during last winter. The restriction within narrow limits of the epidemic is also in opposition to the hypothesis of transmission by the mosquito.

#### Epidemiology.

There were, as we are informed, undoubted cases of Weil's disease during the winter of 1915-1916 which were seen at the base hospitals, but the diagnosis was not confirmed by animal inoculation. So far as we know, the first cases which were recognised in this area occurred at the end of April and the beginning of May, 1916. The number of cases varied from time to time. There were more cases seen during the early part of July and the end of August than at any other periods, though there were a few cases passing through during the whole summer. At one time there were 15 cases under observation, and others had been evacuated on admission as sufficiently well to travel. The incidence seemed to vary with the weather conditions. Thus during and immediately after a dry, warm spell of summer weather there were very few cases, but with the advent of rainy weather the incidence went up and many cases were admitted. On two occasions this occurred, the most striking being after the dry spell which prevailed during the end of July and the first fortnight of August. From August 1st to the 23rd there were no cases of jaundice, and from August 23rd to Sept. 1st 12 cases were admitted. Rain fell in considerable quantities from August 13th to the end of the month.

We know of only one officer who definitely developed Weil's disease, all the cases having occurred among the other ranks and practically always among the "trench troops." The men always either developed the disease in the front line or very soon after they had been relieved. Certain divisions in a corps were affected, others being free. Within the divisions certain brigades were affected, and within the brigades certain regiments had more cases than others. We found that a regiment which had a number of cases while in the line was not infected while in rest billets, but again produced cases when it returned to the trenches. There were certain areas from which cases came, and if we represent the line from which we collect as a straight line divided into six segments, numbered from left to right, Segment 1 and Segment 4 provided the great majority of cases.

1	2	3	4	5	6
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By the kindness of Colonel Gerrard, A.M.S., we were allowed to see a "spot map" of Sector 1, which had been kept for about two months, the map representing the cases as they occurred among the troops in occupation of the area, and giving the place where the affected men had been on duty. This map showed that the cases in the infected area were grouped round two small sections of trench, one at each end of Sector 1.

A new division, which had, up to the time of taking over the infected area, never had a case of jaundice, developed cases of jaundice within 14 days of going into the new trenches, and the same division, after being relieved and going to a new part of the line, was again free from cases. Again a new division took over the infected area, and in the same way cases of jaundice cropped up within a short time.

The trenches in this infected area were wet, not well drained owing to the nature of the ground, and in some places, even in dry weather, never properly dried. This was so in both the segments of the line from which cases came. This is suggestive when one remembers that Inada and his collaborators state that cases of jaundice occurred in the wet shafts of a mine, and that the men working on the surface and in the dry shafts were not infected, and, further, that

when these wet shafts were pumped out on their advice the incidence markedly decreased. They also suggested that possibly the entry of the organisms might be through the skin—a guinea-pig can be infected through the skin—but they were of the opinion, after a general review, that the mode of entry was through the alimentary canal. A point of interest is, though it is complicated by the contemporary onset of colder weather, that the incidence of the disease in our area had practically ceased, and that the troops were issued with high "gum" boots a week before we saw the last case of jaundice. Since writing the last sentence two cases have been noted.

In the proofs of a forthcoming paper by the Japanese workers which was sent to us by Dr. Flexner it is stated that they have succeeded in finding the spirochaetae of jaundice in the kidneys and urine of 38 per cent. of ordinary field-rats in the infected areas in Japan. They suggest that the infection may be conveyed by the rats' urine, either directly or indirectly. We have not yet had time to confirm these findings, but hope soon to be able to do so.

Cases have occurred in the Allied troops in different parts of the front. Dr. L. Martin has published an account of some cases investigated by him in the French Army, and we also know of other cases which have occurred among the troops in Flanders which have also been proved experimentally. Whatever be the portal of entry of the spirochaeta it would appear that wet and muddy trenches are a predisposing factor. If the infection had been water-borne there would have been a more widespread epidemic. If vermin or mosquitoes had been the infecting agents the epidemic could hardly have been so localized, and the experiments which we have performed, such as they are, would seem to exonerate them. We would also add that there have been up to now no ward or laboratory infections. The patients have been cared for in a general ward with no further precautions than would be carried out if they were enteric cases.

#### Conclusion.

The clinical and experimental examination of about 100 cases of Weil's disease which we have been in a position to investigate during the last six months justifies, we think, the conclusion that the disease, as it has been observed among British troops in Flanders, is identical with that described by Inada and his collaborators in Japan.

The virulence of the infection in the cases seen here is much less than that described in Japan, which is well shown by the comparatively low mortality. All the essential findings of the Japanese authors have been confirmed, save that our cultural attempts have so far failed.

In addition we have noted the occurrence of cases of spirochaetosis which have not shown any external jaundice.

The success of our work is to a great extent due to the efficiency and zeal of our laboratory attendant, Sergeant B. Baker, R.A.M.C. (T.F.).

*After-note.*—Since writing the paper we have been able to confirm the statement of the Japanese workers mentioned in the paper with regard to the finding of the spirochaetae in the kidneys of field-rats. Of 9 rats taken from the right part of Segment 1 in the chart in the paper, 5 proved infective to guinea-pigs. Of 6 rats from the left end of Segment 1 one communicated the disease. The kidney of the rat was crushed and emulsified, and injected intraperitoneally into the guinea pig. The disease in the infected animal was typical, and we have found the typical *S. inter hemorrhagia* in the organs of the guinea-pig. Levaditi preparations of the rat kidney have shown the spirochaetae, and we have also found them in films made from an emulsion of the kidney stained by Fontana's stain.

**MEDICAL SICKNESS, ANNUITY, AND LIFE ASSURANCE FRIENDLY SOCIETY.**—The usual monthly meeting of the committee was held at 300, High Holborn, on Jan. 19th, Dr. F. J. Allan being in the chair. The reports submitted showed the epidemic of influenza which has been universal throughout the country to have affected the medical profession. It was decided to apply for a further £15,000 in the new 5 per cent. War Loan, and to convert the society's existing holdings, amounting to £25,500, also in the new 5 per cent. War Loan. This transaction, when complete, will give the society a total of £40,500. The important question of the depreciation of stock values was considered and a further £600 added to the investment reserve, which now stands at £10,000.

## TOXIC JAUNDICE IN MUNITION WORKERS.<sup>1</sup>

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THE aspects of the subject dealt with in this contribution are: (I.) the morphological changes in the blood occurring in a series of 14 clinical cases of toxic jaundice from trinitrotoluene poisoning; and (II.) certain points in the morbid anatomy of the disease as observed in a series of seven fatal cases.

#### I.—Changes in the Blood.

The 14 cases here recorded are those of munition workers who were admitted to hospital during the months August to December, 1916. Most of them have been under observation for weeks or months, and as many of them are still coming up regularly for examination these results must be regarded as partial and preliminary. Sufficient has already been made out, however, to show that very profound changes in the composition of the blood may occur as a result of trinitrotoluene poisoning; indeed, it might be said that such changes are the rule in cases where pronounced clinical symptoms, and especially jaundice, have manifested themselves. One case only out of the 14 examined, a man who, clinically, was never seriously ill, showed no blood changes. All the others had definite deviations from the normal of some sort or another.

*A. Changes in the leucocytes.*—These were worked out on a basis of the absolute number per cubic millimetre of each variety of leucocyte, and the following fairly elastic figures were taken as the limits of the normal:—

Neutrophil polymorphs	... 3600-6750	per c.mm.
Lymphocytes	... 1200-2700	"
Eosinophils	... 30-360	"

The leucocytic changes as calculated on this basis may be given as: (a) Neutrophil leucopenia, (b) neutrophil leucocytosis, (c) lymphocytosis, and (d) eosinophilia.

(a) *Neutrophil leucopenia.*—This, the most striking of the leucocytic changes, was present at some stage of the disease in 9 out of 14 cases (Nos. 1, 2, 4, 8, 9, 10, 12, 13, and 14). In 4 of these (Nos. 1, 2, 10, and 12), 2 of them fatal, the leucopenia was extreme, under 1100 per c.m.m.; of the other 5 affected, the highest neutrophil count was 3175. In the 2 fatal cases (Nos. 1 and 2) the leucopenia was progressive and terminal, the final counts being 120 and 636 respectively. One case (No. 10) illustrates very well the polymorpho-nuclear recovery which accompanied clinical improvement in the condition of the patient. While the patient was seriously ill the neutrophils numbered only 1080 and 1092. A fortnight after his discharge from hospital they were 6280. In 3 cases (Nos. 2, 8, and 10), one of them fatal (No. 2), neutrophil leucopenia was associated with an anaemia of pernicious type (*vide inf. a*).

A progressive failure of the leucoblastic function of the bone marrow is therefore to be regarded as one of the most common manifestations of severe trinitrotoluene poisoning, but that it is not a constant feature in fatal cases is shown by Case 3, details of which are given below. It may be mentioned also that in another fatal case, which was not investigated during life, the bone marrow showed evidence of great leucoblastic, as well as erythroblastic, activity. Here the whole duration of illness was only one month, yet the liver changes were extreme, and it seems reasonable to suppose that there had not been time for the development of the full toxic action on the marrow. Whether this neutrophilic failure is due to a direct action of the poison on the leucoblastic tissue one cannot say with certainty, inasmuch as all the cases in which it occurred presented clinical evidence of an antecedent or accompanying hepatic lesion (jaundice, &c.), while both the fatal cases showed a typical advanced trinitrotoluene cirrhosis of the liver post mortem.

(b) *Neutrophil leucocytosis.*—This change was present in a notable degree in one ('at') case only (No. 3). Here, at the first examination, the total leucocyte count was 14,200,

<sup>1</sup> A contribution to the discussion on the subject at the Royal Society of Medicine on Tuesday, Jan. 23rd.

of which 10,000, or 70·5 per cent., were polymorphonuclears, while a month later, on the day before the patient's death, the figures were 22,000 and 19,200 (87·25 per cent.) respectively. This change was unassociated with any variation in the lymphocytes or in the red cells or haemoglobin, but at the first count there was an eosinophilia of 1000 per c.mm. Post-mortem examination showed the bone marrow in the shaft of the femur to be largely fatty, with a narrow peripheral zone of red. Microscopically there were found small foci of very active leucoblastic proliferation. The inspection,

*Table giving a Summary of Blood Changes in 14 Cases of Trinitrotoluene Poisoning.*

Case.	Age.	Lymphocy-tosis.	Polymorpho-nuclear.		Anaemia of pernicious type.	Eosinophilia.
			Leuco-cytosis.	Leuco-penia.		
1	30	—	+ sl.	++	—	—
2	35	+	++	—	+	—
3*	52	—	—	—	—	+ <sup>1</sup>
4	24	+	—	+	—	—
5	28	+	—	—	—	+ <sup>2</sup>
6	20	+	—	—	—	—
7	40	++	—	—	—	—
8	19	++	—	—	—	—
9	22	+	+ sl.	+	—	—
10	49	+	—	++	+ sl.	—
11*	31	—	—	—	—	—
12	34	—	—	++	—	—
13	18	+	+ sl.	+	—	+ <sup>1</sup>
14	17	—	+ sl.	+ sl.	—	—
—	—	+ above 3000, ++ above 4100 per c.m.m.	+ over 6800, ++ over 19,000 per c.m.m.	+ under 3200, ++ under 1100 per c.m.m.	+ Erythrocytes under 1,600,000, + sl. under 3,000,000, per c.m.m.	+ <sup>1</sup> , over 1000, + <sup>2</sup> , over 400 per c.m.m.
—	—	Upper limit of normal, 2700 per c.m.m.	Normal limits, 3600-6750 per c.m.m.	In each case colour index above 1.	Upper limit of normal, 360 per c.m.m.	

\* Male.

however, failed to reveal any inflammatory cause for the persistent leucocytosis, which stands out in striking contrast to the other fatal and clinically serious cases. In three other cases (Nos. 1, 9, and 13) an early and slight neutrophilia was present, but was speedily followed in each instance by a pronounced leucopenia.

(c) *Lymphocytosis.*—This was one of the most commonly observed changes; it occurred at some time or other in 9 out of 14 cases (Nos. 2, 4, 5, 6, 7, 8, 9, 10, and 13), and varied in different patients from 3150 to 5100 per c.m.m. Considerable variations were often seen from time to time in the same patient, but the fluctuations were irregular and did not appear to have much, if any, significance. In the remaining 5 cases the lymphocytes ranged within normal limits, except that in two cases (Nos. 8 and 10) there was a single temporary drop to 1040 and 1160 respectively. The chief point to be observed is that even in fatal cases and in those showing profound polymorphonuclear or erythrocytic failure the lymphocytes were maintained at or above the normal level. In two cases a lymphocytosis was the only change noted.

(d) *Eosinophilia.*—This was observed in three cases (Nos. 3, 5, and 13), and in two of these it was well marked, once (No. 3) accompanying a marked neutrophil leucocytosis, once (No. 13) with a slight neutrophilia. It appears to be of doubtful significance, but it may be noted that in no case did an excess of eosinophils coexist with a neutrophil leucopenia. Altogether the number of eosinophils was found to be a very variable quantity in these cases.

B. *Changes in the erythrocytes and haemoglobin.*—These have been much less conspicuous than the leucocytic changes. A serious degree of anaemia was observed in 3 cases only, all the others, including 2 of the fatal cases, had red cell counts of over 4,000,000, but a slight grade of chlorotic anaemia was present in several. In the 3 serious cases the anaemia was of the "pernicious" type, with a colour index over 1, but very varying degrees of severity were presented. In the most extreme case there was a fall in the red cells to well under 1,000,000, and as the haemoglobin was not reduced to anything like the same extent (25-30 per cent.) a high colour index (1·5 to 1·8)

presented itself. The erythrocytes in this case were greatly altered qualitatively, anisocytosis was well marked, with many megalocytes. During the worst phase numerous erythroblasts made their appearance, and polychromatophilia was present. In the other 2 cases the red cells fell to 1,500,000 and 2,900,000 respectively, with colour indices of 1·4 and 1·1. Qualitative changes in the red cells were not striking, some anisocytosis with many megalocytes, and in one case slight polychromatophilia. It is to be noted that punctate basophilia was not seen in any case, which is in striking contrast to the findings of Malden in workers in dinitrobenzene and anilin.

## II.—Some Points in the Morbid Anatomy.

One of the chief problems here is the nature of the liver changes. The lesion appears to lie somewhere between a subacute yellow atrophy and an ordinary multilobular cirrhosis of irregular distribution. The action of the poison on the hepatic cells is probably slow and insidious, and the degenerative changes are speedily followed, if not actually accompanied, by leucocytic infiltration and fibroblastic overgrowth. The degenerative and other processes, once set going, are progressive, even when the patient has been removed from the influence of the poison, and in a certain proportion of cases a fatal termination ensues in from 4 to 12 weeks after the first symptoms. Certain portions of liver tissue escape complete destruction, and these show evidence of more or less regenerative hyperplasia. It may be assumed that in some cases this persistent and regenerated hepatic tissue will be sufficient to maintain the life of the individual for a considerably longer period than three months, but what the ultimate fate of such persons will be time alone can show. The after-history of surviving cases of trinitrotoluene poisoning will require to be carefully investigated, not only on account of their great intrinsic interest, but also for the light they may throw on cirrhosis of the liver in general.

I have recently had the opportunity of examining, post mortem, 12 cases of accidental death in workers at a munition factory. In one of these, a woman aged 38, distinct liver changes were discovered—namely, an early but definite round-cell infiltration of the portal tracts and numerous discrete (?) regenerative nodules of varying size scattered throughout the organ.

With regard to the series of 7 post-mortem examinations on which these remarks are based a few points of outstanding interest may briefly be referred to.

The weight of the liver varied from 20 to 32 ounces, the average being 27 ounces. The degenerative cirrhotic process, as evidenced by the dark-red contracted areas, was always most advanced in the left lobe and inferior marginal region of the right lobe. Often these two portions of the organ were composed almost entirely of red tissue. Another striking feature was the frequency with which large rounded yellow nodules projected from the under surface of the right lobe on each side of the gall-bladder, less often from the Spigelian and quadrate lobes.

The bone marrow of the femur was examined in 6 cases. In 5 of these the red marrow was in excess, extending well down the shaft of the bone, but on microscopic examination a definitely erythroblastic reaction was found in one case only. Here the yellow marrow of the shaft was completely replaced by a cellular red marrow, the appearance being comparable to that seen in pernicious anaemia. Evidence of considerable leucoblastic activity was also present. Unfortunately, there had been no opportunity to examine the blood during life. In Case 3, the patient with neutrophil leucocytosis, the shaft marrow was fatty, with a narrow red layer next to the bone. Microscopically some small foci of active leucoblastic proliferation were seen.

The spleen was never appreciably enlarged, the weight varying from 4 to 7 ounces in different cases.

Aëtates to the extent of five or six pints was present in 3 cases. Clinical examination of the fluid in one case showed a very scanty cellular deposit with a preponderance of leucocytes. A very few red blood corpuscles and endothelial cells were also present.

Haemorrhages in various situations were present in 5 cases, most frequently in the peritoneum and pericardium, less frequently in the stomach, lungs, pleura, endocardium, and skin. In one case there was very extensive haemorrhage into the peritoneum and subperitoneal cellular tissue, especially

of the omenta, mesocolon, mesentery, and appendices epiploicae. In the same case there was profuse terminal oozing into the stomach. In the other 4 cases the haemorrhages were mainly petechial.

Perhaps the most interesting single case was that of a man, aged 52, where the lesions of trinitrotoluene poisoning were associated with a well-marked haemochromatosis affecting especially the liver, pancreas, and abdominal lymph glands. Unfortunately, the urine had not been examined during life, and at the post-mortem examination the bladder was empty. The haemosiderin granules, which gave a bright blue colour when treated with potassium ferrocyanide and hot hydrochloric acid, but a green colour with cold hydrochloric, were most abundant in the lymph glands. It is fairly certain that we are here dealing with two independent affections, inasmuch as it has been shown that a very long time, a year or more, is required for the deposition of such large amounts of iron-containing pigment, while the illness due to trinitrotoluene was in this man's case only of 10 weeks' duration. It is possible, however, that the pre-existing hepatic lesion may have made that organ unduly susceptible to the action of the poison.

Leeds.

## Reviews and Notices of Books.

### Gynecology.

By WILLIAM P. GRAVES, A.B., M.D., Professor of Gynecology at Harvard Medical School. With 303 half-tone and pen drawings by the Author and 122 microscopic drawings by MARGARET CONOREE and RUTH HESTIS; 66 of the illustrations in colours. London and Philadelphia: W. B. Saunders Company. 1916. Pp. 777. Price 30s.

THIS is designed both as a text-book and a general reference work. It is divided into three parts; the first deals with the physiology of the pelvic organs and the relation of gynaecology to the general organism, the second is intended primarily for the undergraduate and deals with gynaecological diseases, and the third is devoted exclusively to the technique of gynaecological surgery, and is written for the assistance of the advanced student and practitioner. The section dealing with the relationship of gynaecology to the general organism forms a most interesting and instructive review of our knowledge on these points and will prove extremely useful to the student in view of the increasing importance at the present time of the internal secreting glands. It includes an account of hypo-function of the ovaries and its relation to infantilism and a useful résumé of Schickèle and Keller's views on chronic metritis and cystic degeneration of the ovaries and their relation to uterine haemorrhage. Our knowledge, scanty as it is, of the relations to gynaecological diseases of the thyroid, the parathyroid, the adrenals, and the hypophysis is also excellently summarised. As the author points out, the subject is a comparatively new one, and he is anxious to impress upon the student the importance of the correlation of all the branches of medicine and surgery. The completeness with which the author treats these subjects is exemplified by the fact that he includes in his review such conditions as the nervous system, the peritoneum and omentum, the bones and joints, the gall-bladder, and the acute infectious diseases.

Part II. contains a very good account of the common gynaecological affections. We notice that the author does not distinguish between kraurosis and leucoplakia vulva, and the statement that the main symptom of kraurosis is itching is not quite correct. Professor Graves correctly points out that the subject of endometritis is in a state of considerable confusion, yet he does not do much to simplify matters, as he still describes gland hypertrophy resulting from circulatory changes under the heading of endometritis. The section on cystitis and pyelitis is good. There is an interesting description of the radiation treatment of cancer and of Percy's heat treatment. The excellent results obtained by Howard Kelly in the treatment of fibroid tumours by radium are also alluded to—a mode of treatment of much promise for the future. It is surprising to find in so excellent a book a recommendation of the use of intra-uterine pessaries in the treatment of anteflexion of the uterus.

In the section dealing with the amenorrhoea of youth, Professor Graves also quotes Rieck's treatment of amenorrhoea and oligomenorrhoea by the intra-uterine stem pessary only to condemn it. Would it not have been better to have omitted it altogether?

The various gynaecological operations are well and clearly described in Part III., and the value of the book is greatly enhanced by the very numerous and good illustrations, mainly drawn by the author himself. The drawings of the microscopic sections are also good, and the index is a complete one.

### Raymond, or Life and Death.

By Sir OLIVER J. LODGE. London: Methuen and Co., Limited. 1916. Pp. 404. Price 10s. 6d. net.

MORE than three years ago, in his presidential address before the British Association, Sir Oliver Lodge stated his conviction that memory and affection are not limited to that association with matter by which alone they can manifest themselves here and now, and that—as a corollary of this persistence—personality itself persists beyond bodily death. He had been led to this conclusion, not by such things as intuition and revelation, but by the careful and systematic examination of occurrences still regarded as occult, and by the reduction of these to order through the methods of science. The book before us records a further examination of the evidence for the survival of personality in a particular case, and as the case is the writer's youngest son, who met his death during the attack on Hooge Hill in September, 1915, it has a special and poignant interest.

Sir Oliver Lodge deals with his subject in three parts. The first, described as the "Normal Portion," gives a short biographical sketch of Raymond Lodge as he was in life, with his letters from the front and others from brother officers about him. The second part is entitled "Supernormal Portion," and deals with the messages received from Raymond Lodge after his death—"communications," as the author describes them, "from which sentiment is not excluded, though still they appear to be guided and managed with intelligent and on the whole evidential purpose." In the third part, with the heading "Life and Death," the author defines the part which he takes in the great controversy and his view of "the real existence of some kind of vital essence or vivifying principle as a controlling and guiding entity."

With the first and third parts criticism has little place. For the intimate glimpse into a strenuous young life lamentably cut short nothing but gratitude can be felt, and this part alone makes the book worth reading. The equally intimate glimpse into the author's own philosophy—the result of a lifetime of steady patient work and thought—is a second gift of no mean value. The value of the "communications" is much more difficult to appraise. The obvious criticism must indeed arise in every mind: how trivial and indeed almost contemptible are the communications themselves. And the author has done well to devote a chapter to precisely this criticism, explaining that the demand for a proof of the identity of a departed friend is best achieved by the recalling of trifling reminiscences. Affection and lofty sentiment must be the common attributes of the spirit world, but particular little jokes and morsels of fun give away the identity of the "communicator." Let us grant this as reasonable, and let us accept the possibility of communications by this means through a sensitive control, we believe, for our part, that intercourse between spirit and spirit, when any occurs, occurs without the medium of a control. Sir Oliver Lodge appears to have reached by a system of wiring and motor-transformers what may conceivably be freely accessible in wireless telegraphy—if such a simile can be justified.

### LIBRARY TABLE.

*Text-book of Nervous Diseases for the Use of Students and Practitioners of Medicine.* By CHARLES L. DANA, A.M., M.D., LL.D., Professor of Nervous Diseases in Cornell University Medical College. Eighth edition. Bristol: John Wright and Sons. 1916. Pp. 632. Price 21s. net.—Dr. C. L. Dana's well-known text-book of nervous diseases has reached an eighth edition. The previous one was reviewed by us in 1910, but such are the advances in the study of diseases of the nervous system that text-books rather rapidly become

out of date. It was inevitable, for instance, that after a lapse of six years chapters on nervous syphilis and on the serology of nervous disease, on poliomyelitis and epidemic cerebro-spinal meningitis, would require to be largely rewritten, and Dr. Dana has, as a matter of fact, completely remodelled these and other important sections of his book. Among the latter may be specified the articles on the psychoneuroses; neurasthenia has been pushed rather into the background, in the sense that it has undergone a dismemberment; but the writer trusts that he has given a measure of justice to psycho-analysis, because of its place "in the interpretation and occasionally in the therapeutics of the minor psychoses." In its present attractive form Dr. Dana's text-book is assured of still wider recognition and appreciation. To those in search of a not too bulky but not too superficial treatise on neurology written mainly from the clinical viewpoint it can be confidently recommended.

*A Glossary of Botanic Terms, with their Derivation and Accent.* By BENJAMIN D. JACKSON. Third edition. London: Duckworth and Co. 1916. Pp. 427. Price 7s. 6d. net.—This glossary was first issued some 16 years ago by the author, who is the general secretary of the Linnean Society of London, with the object of supplying the student with concise definitions of the botanical terms he is likely to meet, and of helping the expert to recall an obscure term or word employed in a special sense, and the dual purpose has been well fulfilled. The total number of words in the glossary is now 21,000, and their definitions are precise and clear, while the selection of type facilitates easy reference. Obsolete terms are included in order that original papers or books of any period may be understood. The author acknowledges the assistance of a number of experts, including Sir Francis Darwin, in the preparation of the work for the press.

*Surgical Operations with Local Anæsthesia.* By ARTHUR E. HERTZLER, A.M., M.D., Surgeon to the Halstead Hospital. Second edition. New York: Surgery Publishing Company. 1916. Pp. 312. Price \$3.—We spoke favourably of this little book when it first appeared, and the additions which have been made to it will be found useful. The scope of the work has now been enlarged to include many surgical procedures which may certainly be described as major operations, but any surgeon who wishes to employ local anæsthesia should understand that practice is required to obtain the best results, and he will be wise at first to confine himself to the small operations. No doubt with practice some extensive operations can be performed satisfactorily under local anæsthesia, but it is doubtful if such an elaborate operation as the complete removal of the breast and of the contents of the axilla can be thoroughly carried out without a general anæsthetic. The book will serve its purpose as a trustworthy guide to the use of local anæsthetics.

*Fleas as a Menace to Man and Domestic Animals: their Life-history, Habits, and Control.* By JAMES WATERSTON, B.D., B.Sc. Economic Pamphlet, No. 3. Illustrat d. London: Trustees of the British Museum. 1916. Pp. 21. Price 1d.—The flea follows the house-fly and the louse in the pamphlets of the economic series issued by the Natural History Museum. Mr. Waterston, who is entomological assistant at the Imperial Bureau of Entomology, gives a short introduction stating the case against the flea as a carrier of disease, and then devotes ten pages to its structure and habits. The directions for the control of the pest are essentially practical and include the results of recent research.

## THE CONTROL OF VENEREAL DISEASES.

### Public Meeting in Belfast.

A very largely attended meeting, convened by Sir Crawford McCullagh, Lord Mayor of the city of Belfast, was held in the City Hall on Thursday, Jan. 18th. The Lord Mayor, who occupied the chair, said that the information placed before him by a large and influential deputation was a revelation and surprise in regard to the inroads venereal diseases had made into the life of the entire community. He advocated the formation of a strong council in Belfast to do all that could be accomplished to stop the terrible evil. Professor J. A. Lindsay, in proposing a motion to form a branch of the National Council for Combating Venereal

Diseases, gave a full account of the work of the Royal Commission and of its recommendations, and urged a forward movement. The Bishop of Down, Connor, and Dromore (Rev. Dr. D'Arcy), in seconding the motion, said he did so with a profound sense of duty, and pointed out that the present movement had nothing to do with the State regulation of vice, a line of action which he denounced as a mistake morally and an utter failure from the point of view of health, national and personal. The motion was supported by Sir John Byers, who dealt specially with the effects of venereal diseases on women and children, the economic loss to the nation caused thereby, and the relationship of the diseases to maternal and child welfare. He expressed himself as strongly in favour of notification. The Moderator of the General Assembly of the Presbyterian Church (Rev. Dr. West) moved, and Captain W. J. Wilson, R.A.M.C., specialist sanitary officer in the North of Ireland Command, and lecturer in hygiene and preventive medicine in Queen's University of Belfast, seconded a motion appointing a general and executive committee.

### Council and Other Schemes.

The City of London Corporation's scheme for the establishment of a treatment centre in Golden-lane has now received the approval of the Local Government Board, assuming that the Corporation are satisfied that the establishment of the centre away from a hospital will not deter patients from attending through fear of being recognised.—The county councils of East Suffolk and Norfolk and the county borough of Great Yarmouth are arranging with the city of Norwich for a combined treatment centre at the Norfolk and Norwich Hospital with six beds for patients of each sex and a laboratory with competent pathologist. The medical officer will visit outlying districts in a consultant capacity as occasion requires. The cost to the hospital for the first completed year of the scheme is estimated at £1600, of which the city of Norwich is to bear two-fifths.—Dr. F. Shuffebotham reported last week to the Shropshire county council that their public health committee was shortly to draw up a scheme including treatment centres at the North Staffordshire Infirmary (Stafford) and the Wolverhampton General Hospital.

### Enlightenment Campaign.

A little book entitled "Prostitution: The Moral Bearings of the Problem," just published by P. S. King and Son (239 pages, price 1s. net) for the Catholic Social Guild, contains an excellent chapter on Venereal Diseases by a former resident medical officer of the London Lock Hospital who signs himself "J. F." The whole subject-matter, while treated from the Roman Catholic standpoint, is, from a medical point of view, stated fairly and frankly. The Archbishop of Liverpool supplies a foreword containing wise thoughts on the value of modesty and the barrier set up against evil deeds by the exercise of control. The book cannot fail to have a useful influence in the sphere for which it is intended.

**LETTERKENNY MEDICAL OFFICERSHIP.**—At the Letterkenny board of guardians, on Jan. 19th, the party which had been in a minority in the previous week was now in the majority, and granted the money for medicines and appliances refused the previous week.

**EDINBURGH ROYAL INFIRMARY.**—At their recent meeting the general court of contributors to the Royal Infirmary remitted to a committee to consider the report of the managers and the accounts, and the report of the committee has now been prepared. It states that during the past year the managers had taken part with other institutions in the founding of a College of Nursing, the principal objects of which are to promote the better education and training of nurses, to form a register of fully qualified nurses, and to obtain a measure of State recognition for the profession. It is hoped to raise the status of trained nurses by the institution of this College and at the same time to secure adequate recognition of the important work they are performing for the welfare of the nation. A Scottish board has been created to supervise and control the work so far as Scotland is concerned, and the Royal Infirmary has direct representation on the board. The report of the committee of contributors referred to the proposal to give the miners a more distinct voice in the conduct of the institution. The miners had already increased their subscriptions and the managers found themselves in favour of the proposal to give them representation on the managing board.

# THE LANCET.

LONDON: SATURDAY, JANUARY 27, 1917.

## The Problems of Tetanus.

THE present war has set us many problems in the treatment of disease, and though much progress has been made in all sorts of directions, every step forward invariably reveals new paths inviting exploration. One of the most important diseases occurring in the armies on either side is traumatic tetanus. Here, indeed, much has been accomplished. It is uncontestedly proved that a prophylactic dose of tetanus antitoxin has a really wonderful effect in reducing the incidence of the disease; but from the very fact that through the use of the antitoxin an attack of tetanus is prevented arises a great difficulty in deciding in what proportion of cases the disease has been prevented by the antitoxin and in what proportion of cases the disease would not have occurred, even though no antitoxin had been given. Still the great fall in the number of cases in which tetanus occurs, even though other conditions have remained unchanged, tells us, without the possibility of error, that tetanus antitoxin has a very real action in the prevention of the disease. Almost as striking in its testimony to the value of tetanus antitoxin is the appearance of local tetanus and other modifications due to the effect of a prophylactic dose, insufficient wholly to prevent the disease but sufficient to modify it in one way or another. On this interesting aspect of the subject we print to-day a paper by Captain H. BURROWS, and we trust that similar observations are being made by the medical officers to whom the opportunity is given.

The main problems which have to be solved in regard to tetanus have been worked upon recently by Colonel Sir WILLIAM LEISHMAN and Major A. B. SMALLMAN, and the results that they have obtained are recorded in a paper appearing in the present number of THE LANCET. One question still open concerns even the prophylactic dose itself. It may be taken as conclusively proved that the prophylactic dose of tetanus antitoxin has a real and, indeed, great effect in preventing the occurrence of the disease, and it is equally clear that the earlier the prophylactic dose is administered the greater its preventive effect. But there was little exact knowledge as to the effects of delay, so an attempt was made by the authors to see if any precise information could be obtained hereupon, and details were sought as to the precise number of hours which had elapsed in a certain number of cases between the infliction of the wound and the injection of the tetanus antitoxin as a prophylactic. We are dealing only with cases in which the disease occurred in spite of the prophylactic injection, and the statistics

obtained by the authors show that the death-rate from the disease was very definitely less when the dose was given within 24 hours of the infliction of the wound, as compared with the death-rate in those cases in which the injection was given later. Also the statistics indicate clearly that the earlier the dose is given the longer the incubation of the disease. As to the therapeutic use of the antitoxin the difficulties of forming an exact opinion are admittedly great, but a careful examination of the facts seems to show that there is definite evidence that the mortality after doses of 20,000 units is less than when a smaller dose has been given. The route by which the antitoxin should be administered does not admit of exact dictation, mainly because the number of cases is but small, yet it may be said that the figures supplied by Sir WILLIAM LEISHMAN and Major SMALLMAN go to prove that the intramuscular and subcutaneous routes offer the best chance of a favourable result.

Another problem with which the authors have dealt is the association between the occurrence and fatality of traumatic tetanus and the region of the body which has been wounded. Roughly speaking, the figures in the paper would suggest that tetanus after a wound of the body is little more likely to prove fatal than when the wound is situated on a limb. There also appears to be proof that any operation after tetanus has declared itself has a tendency to increase the mortality; but be this as it may, it seems to be clear that it is wise to give a dose of antitoxin before operating, should an operation be needed. The number of cases investigated in the paper is only 160, but the purpose of the authors is served by their consideration, while the smallness of the number must be regarded as the result of the advance of our knowledge in the prevention of the disease, though it renders some arguments less forcible than they would have been had they been based on more material. In our opinion, the most important conclusions to be drawn from the work that Sir WILLIAM LEISHMAN and Major SMALLMAN have done, are these: That in the treatment of tetanus, when once it has declared itself, the intramuscular and subcutaneous routes should be selected in preference to any other; that the intrathecal route is by no means free from danger, and of doubtful efficacy; and that the intravenous route is no more efficacious, and is certainly more dangerous, than either the intramuscular or the subcutaneous methods. They are also of opinion that the dose of antitoxin should be large; if the intramuscular and subcutaneous routes be chosen the dose should be not less than 10,000 units per day for the first few days. It appears advisable that the administration of the antitoxin should not be abandoned too early, for recurrences may occur. It is obvious that it has been sometimes difficult for the authors to draw clear conclusions from the material obtainable. The problems are extremely complex; so many factors enter into every one of them that the results run no small risk of being vitiated by disturbing elements. But we have

no doubt that a valuable service to the study of tetanus has been rendered by Sir WILLIAM LEISHMAN and Major SMALLMAN in the investigation which we publish to-day.

### The Practice of Massage.

THE function of an unused muscle is soon diminished or lost, and when the normal stimulus to contraction fails in part or wholly to reach it through its motor nerve the application of various forms of mechanical and electrical stimulation may have a useful place. The familiar physiological fact which lies at the root of all such treatment is that of the three essential parts of the motor apparatus it is the nerve cell which most readily becomes fatigued, next the muscle fibre, and only at long last the conducting nerve fibre. Where the activity of the nerve cells has been reduced by disease, disuse, or shock, much can be done by massage and appropriate electrical methods to keep the other elements of the motor apparatus in good condition until normal nervous energy is again forthcoming. The normal route is the best one; no other muscle stimulus can entirely take its place, and massage must always be looked upon as a second best. The war, indeed, with its myriads of stiffened and disused muscles has not only brought massage very much to the fore, but has given an indication of the limitations of massage and of the superiority in many cases of active and semi-active movements of the crippled limbs. All has not been done when the patient has been handed over for so long every day to a professional rubber. The indications for massage must be a matter of exact study, and skilled massage may be largely wasted when the surgeon has not been able to prescribe it correctly. There is room—urgent need, indeed—for the accurate scientific study of the indications for massage in order that the supply shall be allotted to the cases which most require it and will gain most benefit therefrom.

The supply of trained masseurs—a term which may conveniently include both genders—has been vastly increased during the war, and the demand is still unsatisfied, although, as we have hinted above, no great certainty exists that they are all being employed on essentially useful work, and that the supply is really insufficient to meet the exact indications for their services. The examination of the trained has in the past been in the hands of the Society of Trained Masseuses, founded in 1894 and incorporated six years later, with its headquarters at 157, Great Portland-street, London, W. The present position and attitude of this society, which has recently granted certificates to men as well as to women, may be seen from a letter circulated last autumn to all hospitals and schools where students are prepared for the society's examinations, the substance of which is as follows:—

The Incorporated Society has endeavoured to fulfil all the requirements of the medical profession, and from its foundation in 1894 has had the support of medical men and women and their active assistance in exami-

nation. The recently appointed Advisory Board of the Society is representative of professional interests. The examination in medical electricity inaugurated by the society since the outbreak of war is entirely conducted by members of the medical profession, who also take part in the other examinations, including those for massage, Swedish remedial exercises, and teachers' certificate. The written part of all examinations is held at local centres, and for years past a practical examination has been held in Dublin and more recently, in response to a demand, in Liverpool and Manchester. Certificate-holders now number 3990 (men and women).

Whilst the pioneer work of the schools of massage included in the London Society has been fully recognised, the feeling has grown that on the one hand students as well as teachers of massage were at some disadvantage in the provinces as compared with the trainees in the metropolis, and on the other hand that the public and the medical profession, as well as the practice of massage itself, would gain by the establishment of a widely representative society directly under medical control, with a board of management elected annually to represent the medical profession and the various charitable institutions. The proposal materialised during the second year of the war in the formation of an Institute of Massage and Remedial Gymnastics. A meeting was held under the presidency of Sir WILLIAM COBBETT, chairman of the board of management of the Manchester Royal Infirmary, a scheme was drawn up embodying the views set forth above, and an organising committee was appointed, with the result that the Institute was formed and its articles of association licensed under the Board of Trade. The first general meeting was held at the Manchester University on Nov. 10th last, when Sir WILLIAM MILLIGAN outlined the scheme, which includes a provision that one-half of the ordinary members of the council (of whom there may be 20) shall be nominated by not more than ten charitable medical institutions of a public character. Honorary Fellows will be elected by the council from members of the medical profession, and a board of examiners will be appointed, to consist of members of the medical profession and persons possessing the necessary technical knowledge. The Institute of Massage is thus a purely examining and certifying body. No fees can be accepted by acting members of the council, and its constitution forbids those concerned in massage for a living from exercising active control in its affairs. We understand that amongst the Fellows of the Institute are the names of many prominent medical men in London, Manchester, Edinburgh, Bristol, and other large centres. The Institute of Massage and Remedial Gymnastics is therefore founded upon lines with which the medical profession can cordially agree, and the energy of its founders should carry it far. It is less evident that it can afford to dispense with the accumulated experience and the training facilities of the Incorporated Society of Trained Masseuses. It would probably be to the advantage of the practice of massage if the useful work which is being done by each separately could be done in common. We trust that conference between the two bodies will result in a working agreement.

## Annotations.

"Ne quid nimis."

### TOXIC JAUNDICE.

AN important discussion on toxic jaundice took place on Tuesday at the Royal Society of Medicine in the combined Sections of Medicine, Pathology and Epidemiology. Surgeon-General Rolleston occupied the chair and the discussion was opened by Dr. T. M. Legge, medical inspector of factories, who communicated an analysis of the reports of 105 certifying surgeons on jaundice due to absorption into the body of tri-nitro-toluene. The discussion which followed was an exhaustive one, bearing on pathology, treatment, and prophylaxis. We are unable to do more this week than publish Dr. Matthew J. Stewart's careful study of the changes in the blood and liver cells; the former during life, the latter from 12 cases of accidental death in munition workers. The blood changes point to a progressive failure of the leucoblastic function of the bone marrow as a frequent, but not quite constant, manifestation of tri-nitro-toluene poisoning. The degenerative changes in the liver, once set going, were found to be progressive, even after removal of the patient from contact with the poison. Dr. Stewart's work illuminates one side of a new and very important question to which we shall have occasion to return.

### THE EXPLOSION IN EAST LONDON.

THE enormous potentialities of the modern explosive were illustrated painfully in the recent disaster in East London, but we may well express wonder and admiration that such serious occurrences have been so comparatively rare since the gigantic work of making munitions all over the country was begun. The substantial immunity from disaster hitherto enjoyed has been due, of course, to the extreme precautions that have been insisted upon by the munition authorities and their loyal observance by the workers. It is valueless to speculate as to what happened in the present instance without stating the grounds for the different theories, and this would be a wrong course. We know that an ordinary fire had started in the factory which proved to be too rapid in its march upon the dynamic powder, although brave and splendid efforts were made to quench this fire, during which the operatives were warned to leave the building. This, no doubt, saved a number of lives, for although the loss of life outside the factory was considerable—and the list will yet be added to from a crowd of seriously hurt—the totals of killed and injured are far lower than the circumstances could have warranted. The chief chemist, Mr. Andrea John Angel, M.A., B.Sc., who perished in his endeavour to cut off the fire from the explosive material, sacrificed his life to save others, and his last deed was truly a noble one. He knew more than anybody what the fearful possibilities were, and he worked in the last moments of his life in the hope of fending them off. The explosion, though limited in its dire results by much prompt and brave action, has caused widespread havoc and misery, and the whole nation is expressing its deep and practical sympathy with the

bereaved and the suffering. A tribute is due to the promptitude with which medical aid was forthcoming; no effort was spared in the ghastly work of rescue, in removing the injured to hospital for treatment, and in placing those so suddenly and cruelly deprived of their homes under shelter where food and what other comforts could be offered them were provided.

### FLAVINE.

THE search for an efficient germicide within the body has gone on for half a century with undiminished enthusiasm, although the number has latterly increased of cautious people who contend that the search must be a hopeless one, because any agent that destroyed the living bacterial protoplasm would also be potent to harm the living tissue cells. The history of the treatment of phthisis has been one long attempt to find some substance more harmful to the tubercle bacillus than to the lung tissue; and the complete failure to find such a substance in the prolonged opportunities of a chronic disease has made success seem less likely in the case of short-term infections. Ehrlich's discovery of organic arsenical compounds such as "606" and "914," which fulfilled the conditions as regards spirochaetes, raised drooping hopes, and Sir Almroth Wright's application of Morgenroth's optochin to the chemo-therapy of pneumonia was an apparently successful piece of germicidal work on bacteria in the living body. Optochin proved not merely germicidal in extreme dilutions quite innocuous to the tissue cells, but was equally effective in the presence of the albuminous fluids of the blood. Since then claims have steadily grown for the germicidal properties of various anilin derivatives, methylene-blue, scarlet red, and brilliant green. Emery called attention in THE LANCET of April 15th, 1916, p. 817, to the high germicidal value of malachite green, finding it, in a piece of work carried out for the Medical Research Committee on a standard method of testing antiseptics for wounds, the most powerful antiseptic he investigated. Working with the *Streptococcus faecalis*, a crescendo series of values was given by biniodide, phenol, perchloride, lysol, malachite green. A further improvement on the last named has now been made by Captain C. H. Browning, R.A.M.C., and his collaborators in the rediscovery of flavine, an acridine derivative of complicated formula originally prepared by Benda at the request of Ehrlich, and found to have a marked therapeutic effect in trypanosome infections. The work was carried out with the aid of grants from the Royal Society's Scientific Grants Committee and the Medical Research Committee in the Bland-Sutton Institute of Pathology at the Middlesex Hospital, and published in the *British Medical Journal* of last week, when the chain of evidence for its claim was established by experimental and clinical data. The potency of flavine is not merely unimpaired by the blood proteins: it is enhanced by them, and its lethal concentration for *Staphylococcus aureus* in serum is one-tenth that required in peptone water. The factor on which the authors lay most stress is what they call the therapeutic coefficient, being the quotient of the concentration of the antiseptic which reduces phagocytosis to one-half and the concentration just sufficient to kill *staphylococcus* in serum. This coefficient for flavine reaches the astonishing value of 400, as compared with 6 for malachite green and  $\frac{1}{4}$  for

eusol. Flavine is practically a selective bactericide. Fourteen months' testing in the casualty department of the Middlesex Hospital has substantiated the results obtained *in vitro*, and a paper by Mr. D. Ligat, acting assistant surgeon to the hospital, relates his favourable experience with the treatment of some 75 war wounds with brilliant green and flavine, of which the latter gave the better results. The preparation of flavine has been worked out under the supervision of Dr. Barger in the laboratory of the Department of Biochemistry (Medical Research Committee). A supply of it will later be available on application to Captain C. H. Browning at the Bland-Sutton Institute, and the result of independent investigations will be awaited with interest.

#### DIABETES INSIPIDUS AND LESIONS OF THE POSTERIOR LOBE OF THE PITUITARY BODY.

VARIOUS changes have been described from time to time as having been noted in the pituitary body and the neighbouring parts of the base of the brain in cases of diabetes insipidus. It is not yet, however, quite certain what are the structures involvement of which is essential for the production of that condition. Camus and Roussey have proved experimentally that polyuria may result, although the pituitary gland proper is not implicated. It would appear that the infundibulum is of some importance in this connexion, as in one observation removal of the pituitary gland with preservation of the infundibulum was not followed by polyuria. Ependymitis and other lesions of the floor of the fourth ventricle, including Claude Bernard's famous experimental puncture, have resulted in the appearance of either simple polyuria or diabetes insipidus. Further, a number of cases have been reported of diabetes insipidus occurring in association with basal lesions of a meningitic nature, either syphilitic or tuberculous or otherwise. In the December number of the *American Journal of the Medical Sciences* Dr. F. Parkes Weber and Dr. Hans Schmidt, of the German Hospital in London, have recorded a case of this description, where a tuberculous patient suddenly developed diabetes insipidus about two years before his death, which was due to pulmonary and laryngeal tuberculosis. The urine was of about the same specific gravity as ordinary tap-water, pale, clear, and free from sugar or albumin, and averaged about 10 litres in the 24 hours. The Wassermann test in the blood serum was negative. There were no fundus changes, no hemianopia, and no radiographic evidence of alteration of the sella turcica. Macroscopically the hypophysis did not appear enlarged, but it was obviously abnormal in its posterior lobe, a change which was readily confirmed microscopically. In proportion to the anterior lobe the posterior was much enlarged, the latter completely enclosing the former and being of a yellowish-brown colour. In the posterior lobe were found large clusters of what looked like compound granular cells; they were large cells with small nuclei staining deeply with haematoxylin. Their cytoplasm had a granular appearance, containing in reality innumerable minute droplets of a lipoid substance; hence, no doubt, the peculiar colour of the lobe, resembling the colour of the suprarenal cortex. The authors have not been able to find any record of a similar change in other reported cases, nor do they theorise on the possible connexion between the clinical and the pathological conditions. The case, nevertheless,

is of some documentary value, especially as the nervous system, apart from the pituitary gland, was found on examination to be normal, while the other ductless glands were also normal, both macroscopically and microscopically.

#### CHILD WELFARE WORK.

AT the Royal Institute of Public Health last week Dr. Janet Lane-Claypon read a paper on the principles of organisation and administration in relation to child welfare work, which laid full stress on matters the importance of which the public is beginning to appreciate. The period between infancy and the commencement of school life constituted, she said, an important gap in hygienic control. Children of from 3 to 5 years developed ailments which were generally first discovered and dealt with when they went to school. By this time the simple measures sufficient to relieve might no longer be of avail. Dr. Lane-Claypon looks forward to the State aid and organisation of many branches of social work now carried on by voluntary agencies. Lecturing at the house of the Royal Society of Medicine, 1, Wimpole-street, on Monday last, by arrangement with the National Association for the Prevention of Infant Mortality, Dr. E. Pritchard welcomed the legislation in regard to the proper care of the new-born child foreshadowed by Lord Rhondda as President of the Local Government Board. A medium of useful publicity in the whole field of medical and social work for mothers and babies is afforded by a new monthly journal entitled *Maternity and Child Welfare* (John Bale, Sons, and Danielsson. Price 6s. per annum, post free), of which the first number has just reached us. This number contains two valuable articles by the medical officers of health of Birmingham and St. Pancras respectively, Dr. J. Robertson on Welfare Work and Dr. T. S. Higgins on the Prevention of Measles Mortality. An editorial note briefly sketches the history of welfare work, commencing with the "Consultations de Nourrissons" at the Nancy Maternity Hospital and Professor Budin's work at Paris hospitals; in this country, with the infant milk dépôt at St. Helens established by Dr. J. J. Buchan, medical officer of health, in 1899, and the foundation of the first school for mothers in the borough of St. Pancras eight years later. The appearance of this new journal is fully justified, even at the present time, and we forecast a sphere of great practical usefulness for it.

#### EPIDURAL INTRASPINAL ABSCESS OF METASTATIC ORIGIN.

IN the *Boston Medical and Surgical Journal* of Dec. 14th last Dr. W. J. Mixter has reported a case of paraplegia due to a very rare cause—epidural abscess—which is overlooked in the text-books. Its recognition is important, as early operation offers a favourable prognosis. A youth, aged 17 years, was seen in consultation. Sixteen days previously he began to suffer from pain, increased on respiration, in the left shoulder and about the left side of the chest at the level of the fifth rib. He also complained of sore-throat. He remained at home from school for a few days and improved enough to return, but was still uncomfortable and evidently not in good health. Five days before he was seen acute retention of urine occurred. He was catheterised and examination of the urine

was negative. The next day he developed stiffness and weakness of the legs, headache, and stiff neck. The retention persisted and was rapidly followed by spastic paraplegia with temperature of 101° F., and he was taken to the hospital. Lumbar puncture yielded clear fluid, not under excessive pressure, the temperature rose steadily and paralysis became complete in the legs. On examination the temperature was 105°, pulse 118, respiration 24, blood pressure 120, and the leucocytes numbered 30,000. There was marked furunculosis of face. The throat was somewhat reddened. He was slightly confused mentally. The pupils were normal. There was no choked disc. The head was held turned somewhat to the left and the neck was stiff. There was definite ataxia of hands, but no motor or sensory paralysis of arms or hands. The arm reflexes were not increased. A definite zone of hyperesthesia was present from 7-9 D, and there was complete anaesthesia below that level. The legs were paralysed and there was priapism. Skin reflexes: abdominal not obtained, cremasteric equal and normal on two sides, normal plantar on left, Babinski on right. Tendon reflexes: knee and Achilles jerks not obtained. Kernig's sign absent. Lumbar puncture yielded clear fluid with very faint yellow tint, not under pressure, which showed a definite coagulum on standing. Laminectomy was performed from the third to the sixth dorsal vertebrae inclusive. Beneath the epidural fat and outside the dura was found a cylindrical abscess cavity running from the third cervical to the first lumbar vertebra and containing creamy, greenish-yellow pus under considerable tension. No evident focus of infection could be made out. The abscess cavity was drained with rubber and the wound closed rapidly. The patient died a few hours later. No necropsy was allowed. The pus showed a pure culture of *staphylococcus aureus*. Evidently there was transverse myelitis due to an acute process; an abscess was thought the most probable. Dr. Mixter thought the abscess to be metastatic from the furunculosis or from tonsillar infection. The possibility of extension from osteomyelitis of a vertebra must be considered, but the condition found on operation seemed to negative this. While extradural abscess formation of this type is rare, its importance is considerable in that operation undertaken early should relieve the paralysis and bring about a cure. The prognosis should be considerably better than when the abscess is secondary to infection of the spine.

THE LANCET, VOL. II., 1916 :  
THE INDEX.

OWING to the continued shortage in the paper-supply the Index and Title-page to the volume of THE LANCET which was completed with the issue of Dec. 30th, 1916, have been printed separately, and copies have been supplied gratis to those subscribers who have, up to Jan. 25th, intimated to us their wish to receive them. Other subscribers will be similarly supplied, so long as the stock remains unexhausted, on application to the Manager, THE LANCET Office, 423, Strand, London, W.C. Such applications should be sent in at once.

OUR contemporary the *Scotsman* celebrates the 100th anniversary of its birthday as we go to press. We congratulate the journal on its well-earned success, especially as it provides its readers with a steady supply of well-considered medical information of exactly the kind that benefits the public.

## PARIS.

(FROM OUR OWN CORRESPONDENT.)

*Rerudescence of Rabies.*

FOR some time past there has been throughout the whole of France an increase in the number of cases of rabies. Rabies has for a long time been epizootic in this country, but it is certain that the situation will be kept well in hand if the regulations are seriously applied. In the Department of Seine cases of hydrophobia in man have been entirely suppressed for some years, thanks to the systematic capture of stray dogs. At the outset of the war the abandonment of a large number of dogs in consequence of the general mobilisation and of the exodus from Paris gave rise to some anxiety. In September, 1914, the Prefect of Police instructed local mayors and commissioners of police to take all necessary precautions. The number of captures of ownerless dogs rose to 4860 and observation showed that they had been for the most part abandoned by their owners, who removed the collars in order to avoid responsibility. The precautionary measures bore fruit, for in Paris from July, 1915, to March, 1916, there was no case of rabies and treatment at the Pasteur Institute was numerically much reduced, but from May, 1916, on the cases began to increase. Happily for Paris the city and even the department have not been affected by this recrudescence, but it must not be forgotten that more than a careful search for stray dogs is required. The sympathetic public must be put on guard against the danger of giving shelter to stray dogs found wandering in public places, for it cannot be known whether they have not been contaminated by the accidental introduction into Paris of dogs bitten and infected outside.

*Professional Re-education of Soldiers.*

A conference on the professional re-education of war cripples, arranged by the Belgian Government, with the cooperation of the French Government authorities, will be opened on March 6th at the Ministry of Labour and Social Welfare in Paris. The conference will have before it very important questions to examine, such as the re-establishment of the functions of limbs injured by gunshot wounds, the replacement of the war cripple in his proper surroundings, his re-adaptation to a new profession, the attempt to raise him to a superior level and to place him under the most advantageous conditions for himself and society at large; in brief, to assure to the war cripple a permanent living. The whole constitutes a task of which the magnitude and necessity are obvious, as well as the great difficulties attached to its execution. To surmount these difficulties the common experience acquired during the first two years of war in the allied countries is to be placed under contribution.

*Poisoning by Motor-gas in Ambulances.*

M. Tanon, at a medical reunion of the 5th Army, drew attention to the inconveniences attendant on the heating of ambulances by the exhaust-pipe of the motor. When the latter functions badly and the joints of the tube are not close a discharge of gas may occur in the interior of the carriage, and result in consequences which in certain cases have been fatal. Similar facts were observed before the war with certain touring cars. The mechanism of the poisoning is not quite simple, for the quantity of carbon monoxide mixed with the gas is minimal, although the lesions observed at autopsy point distinctly to carbon monoxide poisoning. The red blood cells were not destroyed nor was the haemoglobin reduced in the researches made by the pharmacist, Major Ebren. Blood impregnated with hydrocarbons was found to be still capable of absorbing oxygen. The toxic action is more complex, and exerted apparently both on the respiratory apparatus and on the medulla. The early symptoms seemed to be due to a toxic action on the medulla. In view of these observations officers in charge of ambulances should observe great care in supervising carriages warmed in this way, and should direct the chauffeurs to assure themselves of the condition of the patients every time the motor functions badly.

*Increase of Consultation Fees.*

The Association of Medical Men in the Department of the Seine decided, at its last meeting, presided over by Dr. Leredde, to increase the standard of medical fees by 25 per

cent. for all persons whose financial position has not been changed for the worse by the war. The increased charge is naturally aimed at the numerous patients whose position has been actually improved by war conditions. A merchant in any kind of wares may, by common consent, raise his prices in proportion to new charges which fall upon him, and the medical man unquestionably possesses the same right when he is mulcted by increased taxation. The doctors only desire to make their fees proportional to the situation of the people who claim their services. In ordinary times, be it remembered, they have always lost some 15 per cent. of fees in bad debts, which were for the most part unredeemable.

#### *Reinforced Quinine Treatment of Malaria.*

M. Carnot has dealt with this subject at a recent meeting of the Medical Society of the Hospitals, claiming that treatment is insufficient in many cases of recent malaria when quinine is administered by the mouth even in a dose of 1·5 gm. He insists on the great advantage of the intravenous route of administration, one or two ampoules, each containing 0·4 gm. of quinine and 0·2 gm. of urethane in 1 c.c. of water diluted to 20 c.c. with normal saline being injected. This combined method reinforces the action of quinine in pernicious forms of the disease, especially when these are afebrile.

Jan. 22nd.

## THE SERVICES.

### ROYAL NAVAL MEDICAL SERVICE.

To be temporary Surgeons: L. Baxter, N. S. Hewitt, W. O. Lodge, W. J. C. Watt, R. W. Pritchard, and J. P. Ross.

### ROYAL ARMY MEDICAL CORPS.

To be temporary Lieutenant-Colonels: Sir Arthur Chance, A. B. Mitchell, and H. V. Rigby (Captain, R.A.M.C., T.F.).

Temp. Capt. C. D. Pye-Smith to be temporary Lieutenant-Colonel whilst in command of a Field Ambulance.

The undermentioned relinquish the acting rank of Lieutenant-Colonel on requesting: Major H. W. Long, Temp. Capt. J. La F. Lauder, D.S.O., and Temp. Major C. E. L. Gertwood.

Majors to be acting Lieutenant-Colonels whilst in command of a General Hospital: M. C. Wetherell and Arthur W. Gater.

To be Acting Lieutenant-Colonels whilst in command of a Casualty Clearing Station: Brevet Lieut.-Col. FitzG. G. Fitzgerald and Major J. H. R. Winder.

Capt. A. M. Pollard to be acting Lieutenant-Colonel whilst in command of a Field Ambulance.

Capt. E. M. Midleton to be acting Major whilst in command of a Field Ambulance.

Lieutenants to be temporary Captains: C. E. A. Huddart, T. H. Oliver, J. Ross, J. K. Cheesman, D. K. MacDougall, H. F. Bruce-Smith, G. S. Terry, J. P. O'Connor.

To be Lieutenants: Captain J. A. W. Ebden (R.A.M.C., Spec. Res.) with temporary rank of Captain, T. C. Bowie, G. C. Robinson, D. H. Coats, C. B. C. Anderson (R.A.M.C., Spec. Res.), P. E. D. Pank, G. Moulton, and R. H. C. Prym (from R.A.M.C., Spec. Res.).

O. P. N. Pearn to be temporary Captain whilst employed at the Lord Derby War Hospital.

Temporary Captains relinquishing their commissions: O. P. N. Pearn, J. Hanson, A. H. R. Duncan, F. J. Dixon, F. McKee, R. G. Brown, R. D. Forbes, J. E. M. Brown, A. W. Anderson, H. H. Prentiss, N. I. Sinclair, J. A. K. Bravton, S. G. Billington, G. W. Charley, E. C. A. Smith, P. J. S. O'Grady, F. G. O'Donnell, N. R. Rawson, A. V. J. Harrison, F. S. Rowland, D. H. Griffiths, G. E. Genge-Andrews, E. B. H. Bon, J. S. Hall, F. A. Murray, H. L. Aphorn, W. R. S. Watkins, T. J. Burton, P. Butler, J. E. Cook, J. Allan, R. B. Taylor, M. Haynes, J. S. Martin, J. Allison, H. S. Berry, H. Catling, G. Coats, R. S. Miller, F. Ayre (on account of ill-health).

Surgeon-Capt. A. J. Clarke (Overseas Contingent, B.W.I. Regiment) relinquishes his commission.

Temp. Hon. Cap. A. E. Ward, having resigned his appointment at the Springburn and Woodside Central Red Cross Hospital, relinquishes his commission.

Temporary Lieutenants relinquishing their Commissions: G. W. Racey, S. E. T. Suann, J. A. Davidson, A. Chancé, H. S. Sims, R. M. Moore, R. Paterson, H. Denison (on account of ill-health).

### SPECIAL RESERVE OF OFFICERS.

To be Lieutenants: G. G. Jack, D. Mitchell, H. C. Roberts, C. Tighe, B. Mountain (from University of London Contingent, O.T.C.), J. A. Charles, J. B. Leish (from Manchester University Contingent, O.T.C.), W. B. Lawson.

Captains to be acting Lieutenant-Colonels whilst in command of a field ambulance: (Acting Major) R. Magill, W. H. L. McCarthy, W. R. Gardner.

### TERRITORIAL FORCE.

Capt. W. A. Slater, from 1st Northern General Hospital, to be Captain.

Capt. K. B. Clarke relinquishes his commission on account of ill-health, and is granted the honorary rank of Captain.

Capt. C. A. Spunner is seconded for duty with a hospital abroad, and Capt. J. N. Robbins is seconded while holding the appointment of Deputy Assistant Director of Medical Services.

John Steedman to be Lieutenant.

Lieuts. K. F. M. Davison, G. L. Findlay, and G. D. Newton to be Captains.

Major J. S. Mather relinquishes his commission on account of ill-health and is granted the honorary rank of Major.

Attached to Units other than Medical Units.—Major R. J. R. C. Simons relinquishes his commission on account of ill-health, and is granted permission to retain his rank and wear the prescribed uniform.

### TERRITORIAL FORCE RESERVE.

Surgeon-Major G. O. Parsons, from Glamorgan R.G.A., to be Surgeon-Major.

### DEATHS IN THE SERVICES.

Lieutenant-Colonel C. M. Thompson, I.M.S., on Dec. 24th, 1916. He entered the service in 1881 and served in the Tirah Expedition in command of the 44th N. F. Hospital, 3rd Brigade, was present at the actions of Chargu Kotal, Dargai, passage of Datoof Defile, Samaghia Pass and took part in the operations in the Wazir Valley and in the Bara in 1897 (medal and two clasps). Subsequently he was appointed Civil Surgeon at Outramkund and later Staff Surgeon at Secunderabad, being appointed senior medical officer of the General Hospital, Madras, in 1919. He was Principal of the Madras Medical College until 1911. Since the commencement of the war and up to a year ago he was employed temporarily at the Home for Indian Soldiers, Barton-on-Sea.

## VITAL STATISTICS OF ENGLAND AND WALES FOR 1916.

THE following statement shows the birth- and death-rates and the rates of infant mortality in England and Wales, and in certain parts of the country during the year 1916, the figures being provisional:—

	Death-rate per 1000 living.*	Deaths under one year per 1000 births.
England and Wales... ... ... ...	14·0	91
96 great towns, including London (populations exceeding 50,000 at the Census of 1911) ... ... ...	14·4	98
148 smaller towns (populations from 20,000 to 50,000 at the Census of 1911) ... ... ...	13·0	90
London ... ... ...	14·3	87

\* The death-rate for England and Wales is based upon deaths in the whole population and an estimated total population of 36,250,000. The birth-rate is similarly calculated as 21·6 per 1000. The death-rates for the towns are based upon civil deaths and estimated civil population. The birth-rates cannot be stated. In all cases the population used relates to the year 1915.

## URBAN VITAL STATISTICS.

(Week ended Jan. 20th, 1917.)

**English and Welsh Towns.**—In the 96 English and Welsh towns, with an aggregate population estimated at nearly 18,000,000 persons, the annual rate of mortality during the week was equal to 16·2, against rates steadily declining from 23·7 to 16·8 per 1000 in the four preceding weeks. In London, with a population of over 4,000,000, the death-rate was 6·5, or 1·1 per 1000 below that in the previous week; among the remaining towns it ranged from 6·8 in Dewsbury, 9·7 in Wakefield, and 10·0 in Coventry, to 23·5 in Exeter, 26·6 in Oxford, and 27·9 in Bath. The principal epidemic diseases caused 238 deaths, which corresponded to an annual rate of 0·7 per 1000, and included 82 from measles, 59 from diphtheria, 56 from infantile diarrhoea, 24 from whooping-cough, 9 from scarlet fever, and 8 from enteric fever. The deaths from measles were 1 in excess of the average in the three preceding weeks, and caused a death-rate of 1·3 in Coventry, 1·5 in Birkenhead, and 3·7 in Wimbledon. The 812 cases of scarlet fever under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospitals showed a further decline, while the 1396 cases of diphtheria were 1 in excess of the number at the end of the preceding week. Of the 5375 deaths from all causes in the 96 towns, 211 resulted from violence. The causes of 60 of the total deaths were uncertified, of which 20 were registered in Birmingham, 5 in Manchester, and 4 each in London and Liverpool.

**Scotch Towns.**—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death-rate was equal to 17·6, against rates declining from 19·6 to 18·1 per 1000 in the four preceding weeks. The 356 deaths registered in Glasgow were equal to an annual rate of 16·6, against 16·5 per 1000 in London, and included 7 from measles, 5 from infantile diarrhoea, 4 from whooping-cough, and 1 each from enteric fever and diphtheria. In Edinburgh the 108 deaths corresponded to an annual rate of 17·0 per 1000, and included 1 fatal case of whooping-cough and 1 of diphtheria.

**Irish Towns.**—The 187 deaths registered in Dublin were equal to an annual rate of 24·4 per 1000, and included 3 from measles and 1 each from scarlet fever, whooping cough, diphtheria, and infantile diarrhoea. In Belfast the 147 deaths corresponded to an annual rate of 19·5 per 1000, and included 7 from infantile diarrhoea, 5 from measles, 3 from whooping-cough, 2 from diphtheria, and 1 from enteric fever.

## Correspondence.

"Audi alteram partem."

### THE PROPHYLAXIS OF VENEREAL DISEASES.

*To the Editor of THE LANCET.*

SIR.—The critical and helpful articles that were published in THE LANCET and the *British Medical Journal* on Jan. 13th have led me to ask for space in your columns for a few remarks on this subject which, essentially medical though it is, is of high concern to the whole community. Since the appearance of my letter in the *Times* of Jan. 6th I have had numerous communications from various quarters indicating such concern, as well as a wide-spread conviction that medical men should make known to their patients generally those means of prophylaxis against venereal infections with which pathological science has in recent years supplied them. Up to now, however, although the public have been very generally and rightly instructed of late with respect to the multiform and dangerous results of syphilis and gonorrhœa, and also to the necessity of prompt treatment after these diseases have been contracted, a general silence has prevailed on the matter of prevention, not only on the part of the many lay members of the community who have earnestly and successfully promoted the important measures which have now found accomplishment, but also of the medical profession at large, inclusive of that special section of it which is devoted to the guardianship of the public health. The reason of this public attitude on the part of the medical profession generally—I am not forgetting the many individual medical men who are in no wise reluctant to aid in checking the spread of these infections by imparting their knowledge as freely as possible—is not far to seek. Medical men are hampered in this action by the “mediaeval doctrine” which, though it may not be expressed in words, is still operative in leading the public to regard sexual diseases from a different standpoint from that which they maintain towards all others. While the more prominent and powerful lay promoters of the recent great advance made in informing the public of the dangers of venereal diseases decline to take notice of the paramount importance of preventing infection at its source, it is perhaps scarcely to be wondered at that the medical profession as a body has not entered into an undertaking which, without some encouragement, would at least be difficult and liable to miscarry a rapid success. It is undeniably true that neither moral nor religious instructions will succeed in the future any more than they have succeeded in long past centuries in checking to any considerable extent the gratification of sexual instinct in both sexes by “irregular intercourse.”

The danger of venereal infection has been long held out as a physical deterrent, but with little or no effect, and no adequate result in this direction can be expected from the more detailed accounts of these dangers that have lately been given to the public. However great the dangers, the fact remains that only a comparatively small proportion of either sex, with the exclusion of regular prostitutes, contract syphilis or, indeed, gonorrhœa; and thus the risk is constantly taken even by those who are well aware of what consequences are entailed by failure to escape infection.

In a private letter to me Sir James Crichton-Browne, who has granted my request to be permitted to use it as I like, says:—

If syphilis were an inevitable ordained consequence of irregular sexual intercourse something may be said for leaving it alone; but as it is only a very occasional consequent it can be but feebly deterrent, if deterrent at all, and ought to be unhesitatingly prevented in every possible way. The prevention of syphilis and the prevention of immorality should be kept wholly distinct from each other. The Government have interdicted the sale of whisky less than three years old, the object being that in maturing it may be freed from the ingredients that produce injurious effects on the consumer. But, according to the opponents of the prevention of syphilis, that must be all wrong. The rarer the whisky—the more fused oil in it, the better; so that men may be prevented from drinking by the dread of delirium tremens. I remember Lord Houghton's telling me that at the time of the discussion on the “Contagious Diseases

Act” he had some conversation with Mrs. Butler. At last he said to her, “It seems to me that you regard the syphilitic virus as a beneficent moral agent. Now, tell me, if you had that virus locked up in a box and you had the key, would you keep it locked up or would you let it loose upon humanity?” Mrs. Butler vouchsafed no answer.

I wholly agree with the criticism in the *British Medical Journal* that effective measures of prevention must have regard to both sexes, “it being at least as likely that one infected woman will infect many more, as that one infected man will infect many women.” This fact is ignored in much that has lately been spoken and written on this subject. The dissemination of the disease by the male has especially attracted attention now owing to the assumption, based, I suppose, on some ascertained facts, that large numbers of infected soldiers will return to this country during and after the war. It is on this assumption at least that a special plea of urgency for prompt and effectual treatment of the disease was put forward when financial aid from the State, for this purpose, was recently sought and successfully obtained. I do not hesitate in expressing my opinion that doctors not only are justified in spreading the knowledge we now possess of effectual prophylaxis in respect to venereal disease, but also are bound in duty to do so in view of their knowledge of the results of disease, and of their functions as promoters of the public health.

Suggestions have been made to me for the forming of an association of medical men and others with human interests for promoting the knowledge of effectual prophylaxis against venereal diseases; but it seems clear that an initiative in this direction would be taken with far better prospects of quick success at the present juncture, if not by the Local Government Board itself, by the existing Society of Medical Officers of Health. The question is, and should be, regarded as exclusively medical. The time has come for plain speaking and prompt action on the part of the medical profession. In the words of THE LANCET article, “preventive treatment is a logical step forward, and ought to be taken at once.”—I am, Sir, your obedient servant,

Jan. 23rd, 1917.

H. BAYAN DONKIN.

### THE PHENOMENA OF ANAPHYLAXIS.

*To the Editor of THE LANCET.*

SIR.—I have read with the greatest interest and with much benefit Captain S. Wyard's excellent article on the phenomena of anaphylaxis in your issue of Jan. 20th, and, while I do not remember reading a clearer exposition of the subject, yet there are points not clear to me. It is the clinical point of view in which I am most interested.

In dealing with the sensitisation of man, Captain Wyard speaks of “considerable,” “small,” and “massive” doses of serum. He specifies what he means by a “small” dose, but he does not do so of the terms “considerable” and “massive.” He says: “Persons receiving massive injections are not, or, at all events, not always, hypersensitive after six weeks.” Again: “A massive first dose in many cases requires longer to produce hypersusceptibility than a smaller.” Again: “The anaphylactic state after two or three small doses may still be absent 28 days after the last;” and again: “Until proof to the contrary is forthcoming, it must be assumed that anyone who has received one or more injections more than 14 days previously is in this state”—(susceptibility to anaphylaxis).

I am unable to follow him as precisely as I could wish. And I would be much obliged were he to help me, for I am not writing in a captious spirit. I feel sure he will excuse me when I say that his description of the phenomena of serum disease in man requires amplification. For example, he does not mention the circinate rash, which is next most common to the urticarial, and he says that the morbilliform rash is sometimes, but more rarely seen than the urticarial. As a matter of fact, nowadays the morbilliform rash bears no such comparison, for it is rare.

I am, Sir, yours faithfully,

FREDERIC THOMSON.

North-Eastern Hospital, Tottenham, N., Jan. 22nd, 1917.

*To the Editor of THE LANCET.*

SIR.—I have often wondered whether, in the case of severe immediate reaction of anaphylaxis, sufficient attention is given to the possibility of swelling of an urticarial type

in the larynx. A patient suffering from diphtheritic laryngitis was admitted to hospital under my care. Tracheotomy was performed and antitoxic serum given subcutaneously. The tube was removed later. Recovery was slow. Following on a treatment which was then being given trial, a second injection of serum was given about six weeks after the admission of the patient to hospital. Within a few minutes of the injection the patient (a small boy) developed an extraordinarily severe urticarial rash in practically all regions. At the same time typical signs of laryngeal obstruction were seen and the boy became very cyanosed. The tracheotomy wound was reopened and a tube inserted. All respiratory embarrassment disappeared at once. The simplest explanation seemed to be that the urticarial rash had extended to the larynx.

I should therefore certainly try the effect of tracheotomy if in a severe immediate reaction, accompanied by urticaria, a fatal result was threatening.

I am, Sir, yours faithfully,

Jan. 20th, 1917.

MILES B. ARNOLD.

### DEFINITION OF ACUTE ALCOHOLISM.

*To the Editor of THE LANCET.*

SIR.—I have read with interest Dr. W. O. Sullivan's letter on this subject in your issue of Jan. 20th and I gladly supplement the data of my original letter in the direction desired. I fear, however, that I can give no explanation of the curious paradox that the police figures for the Edinburgh area show an apparent material decrease of drunkenness among women, while the admissions into my wards of women suffering from acute alcoholism have more than doubled. This paradox is all the more remarkable because the conclusion indicated by the hospital figures, as to the great increase of drunkenness among women, is confirmed in the experience of the officials of the out-patient department where minor cases of alcoholism are dealt with, and also by all the collateral evidence obtained.

In reply to one query of Dr. Sullivan's, I may say that there has been no marked alteration in the type, and no change in classification, during the five years in which the wards in question have been under my care.

I have not looked into the point whether there has been any special change observed in the incidence of frankly declared delirium tremens. I attach little importance to this point. Delirium tremens is merely an incident in the development of some cases of acute alcoholism. I should say it is observed in from one-third to one-half of the cases admitted, the former figure being probably the more correct. By way of illustration, I may say that since reading Dr. Sullivan's letter I have taken the last ten cases of alcoholism admitted to my wards, since the 10th of this month, eight of which were brought in by the police; two of these only developed any symptoms of delirium tremens.

My experience leads me to doubt whether statistics of delirium tremens can be regarded as a useful and reliable means of gauging alcoholism in England; if the figures of the Royal Infirmary may be taken as typical of the rest of Scotland, I am satisfied they would not form a complete and reliable guide to sobriety in Scotland.

I am, Sir, yours faithfully,

Edinburgh, Jan. 22nd, 1917.

CHALMERS WATSON.

### A PLEA FOR THE GENERAL USE OF PNEUMATIC TOURNIQUETS.

*To the Editor of THE LANCET.*

SIR.—The usual method of arresting the circulation in the forearm and hand or the leg and foot during operations on these extremities by winding a tightly stretched piece of elastic tubing round the arm or thigh over a layer of gauze has certain disadvantages. The assistant may fail to apply the tourniquet with sufficient tightness to arrest the circulation, or, more often, the tube is applied with some roughness and so as to exert an unnecessary degree of compression. I have seen disappearance of the radial pulse persist for several days after the use of such a tourniquet on the arm of a young adult. The rubber tube must be applied before the towels are arranged and often some minutes before the first incision is made, and its release towards the close of the operation is often an inconvenient business. If vessels

and nerves can be injured by this procedure in a young healthy subject, how much more serious is the danger in old patients with diseased and brittle arteries. Perhaps the occasional recurrence of gangrene in the flaps of an amputation undertaken for diabetic gangrene is due in no small measure to injury and thrombosis of the main artery at the site of the tourniquet.

The ordinary sphygmomanometer makes an excellent pneumatic tourniquet for use in operations below the middle of the thigh or arm. The pneumatic armlet is applied to the upper part of thigh or arm and the pressure raised and maintained for a moment to ensure that the apparatus does not leak. The administration of the anaesthetic is begun, the limb is raised to empty the veins, and the sterile towels arranged. When the surgeon is about to begin the armlet is inflated till 5 mm. of mercury above the maximum systolic pressure is registered by the manometer. A spring clip may then be applied to the tube coming from the inflating bulb to guard against any leakage through its valve. When the main vessels have been ligatured the pressure can be instantly lowered to enable the recognition of fine bleeding points, or as instantly raised again should the hemorrhage be too free. A bicycle pump can be substituted for the usual inflating bulb with advantage.

To arrest the circulation at the level of the hip or the shoulder a special pneumatic band has to be constructed, but for the greater number of amputations or other operations on the extremities the ordinary sphygmomanometer, which is in the armamentarium of most doctors, suffices. Such a pneumatic tourniquet has the following advantages :—1. No violence can be caused by its application. 2. Only the minimum pressure required is employed. 3. The tourniquet can be brought into action or released easily and instantaneously and so need not be in force for a second longer than is necessary.

I am, Sir, yours faithfully,

KENELM H. DIGBY, M.B., B.S. Lond., F.R.C.S. Eng.,  
Ho Tung Professor of Clinical Surgery, University of  
Nov. 27th, 1916.  
Hong-Kong.

### THE CAUSE OF TRENCH-FOOT.

*To the Editor of THE LANCET.*

SIR.—If wetness, leading to electrical changes, were the cause of trench-foot, as suggested by Mr. Nepean Longridge in your issue of Jan. 13th, warm water should cause the condition as much as cold water. Now, anybody who has observed rice-growing and waterside communities in the tropics will know that they do not suffer from trench-foot, though their feet are constantly wet.

I am, Sir, yours faithfully,

V. T. CARRUTHERS,  
Captain, R.A.M.C.

### THE TREATMENT OF TRENCH-FOOT.

*To the Editor of THE LANCET.*

SIR.—The experimental work of Lorrain Smith, Ritchie, and Dawson on rabbits suggests that in the affection known as trench feet the primary and most serious injury is sustained by the blood-vessels. They found in their experiments that the vessel walls had been seriously damaged; there was swelling of the intima and vacuolation of the cells of the muscle coat. There was also considerable exudate and the establishment of a condition of local stasis and oedema.

A large number of cases of trench feet have come under my care, and I have been struck by the fact that nearly all these patients complained of the pain which they endured at night. This symptom, combined with the obvious signs of local vaso-motor paralysis, led me to try the effect of affording external support to the relaxed vessels by means of crêpe bandages. In every case the relief from pain has been striking and immediate, and the progress of cases so treated has been rapid and satisfactory. The bandages should be applied so as to exert a firm but gentle pressure without causing constriction of the vessels, and, as a matter of practice, most patients speedily learn to adjust them for themselves. The entire foot should be bandaged, and the toes can best be included by first enclosing them in cotton-wool. If small patches of broken or ulcerated skin are present the bandages can be applied over the ordinary dressing.

This method of treating trench feet by crêpe bandages will be found most valuable in at once alleviating the pain which is so common a feature of this condition, and, while directly promoting the absorption of exudates, it has the advantage that it need not interfere with any of the usual methods of treatment by massage or electricity.

I am, Sir, yours faithfully,

GEORGE COOPER, B.A., M.D.,  
Medical Officer in charge of Electro-therapeutic Department,  
Jan. 20th, 1917. Royal Victoria Hospital, Netley.

## MUNITION WORK AND CHILD WELFARE.

*To the Editor of THE LANCET.*

SIR.—In common with other districts throughout the country we have been making special efforts during the past few years for the improvement of child welfare and the protection of infant life. Much good has undoubtedly been done, but disappointment has been met with at times, and I have been impressed lately by the fact that munition work is becoming responsible in many cases for home neglect. This can hardly fail to follow if, as seems to happen frequently, the mother as well as the older daughters of a family spend the day at a munition factory. There is a large factory near here which offers tempting wages to every woman capable of work, and in some families, at any rate, the mothers of small children, together with the older girls, are now working there daily, leaving the younger children, including babies, to the care of girls, or even boys, of from 12 to 14, or to the casual charge of neighbours. The remedy would seem to be that before engaging mothers of families at munition works inquiry should be made, and that the mother should not be engaged unless she can show that some responsible woman is in charge of the children. Munition work is, of course, all-important, but if it be carried on at the expense of the young children of the nation the balance might work out ultimately on the wrong side. From a national point of view the mother's most important work is with her children.

I am, Sir, yours faithfully,

H. CAMERON KIDD,  
Jan. 11th, 1917. Medical Officer of Health of Bromsgrove.

## THE PREVENTION OF VENEREAL DISEASE.

*To the Editor of THE LANCET.*

SIR.—Your remarks upon this subject in the leading article in THE LANCET of Jan. 13th are of great practical moment. In venereal disease prevention is the treatment, as very few cases are actually cured. Time and money fail the sufferers, and so these pass into chronic states.

In 1907 I inquired into the German system of prevention, and after much trouble I obtained reliable information. It may be of interest now, and also a practical lesson to us, to state that in 1911 I wrote to the English consul in a leading German city asking him to find out all the facts relating to venereal prevention. He replied that he had inquired in "several competent quarters," and that he was "assured by naval officers of high standing that they knew nothing of such a system"! What ignorance! In 1912 I produced a small case containing drugs to prevent gonorrhoea, chancroid, and syphilis, spending about £50 upon this outfit. My idea was that the shipping companies would take it up, and—after the German plan—fix a slot machine, with the little tin cases inside, so that each seagoing man before going ashore could, by dropping in 1s. or less, obtain a reliable supply. I still hope that such slot machines will be fixed on each ship and at the various sailors' homes and other places.

When I was requested by the Liverpool S.S. Owners' Association to draft a report for presentation to the Venereal Commission, I described fully the system of prevention in various countries. This report was sent to the Commissioners, and also several of the little tin preventive boxes. I regret the Commission did not recommend this suggestion. It is instructive—in this commercial country—that when I attempted to advertise it in so many of the medical and lay papers all refused to insert it! Now that "Mr. and Mrs. Grundy" have been suffocated, I am glad to see that my pioneer work is bearing practical results. The German system makes a marked mistake in attacking this big question from the male side

only. The female must be taken in hand also, especially as it is now recorded that in certain U.S.A. (and other) cities the female prostitute is known to have not less than 30 male prostitutes *daily* having sexual relations with her. We are at the beginning only of this great national question of prevention of venereal diseases, and prevention is almost the only rational programme to adopt. It will give the best results of all.<sup>1</sup>

I am, Sir, yours faithfully,

Liverpool, Jan. 20th, 1917. ROBERT R. RENTOUL.

## THE NOMENCLATURE OF "INTERNAL SECRETION."

*To the Editor of THE LANCET.*

SIR.—Dr. Blair Bell adopts a method of controversy in which I cannot compete with him. I am content to let such epithets as "back-handed," "arrogant," and "vain-glorious" recoil upon the person who employs them.

I am, Sir, yours faithfully,

Edinburgh, Jan. 23rd, 1917. E. A. SCHÄFER.

## THE OFFICIAL VISIT TO THE FIELD BUILDING.

*To the Editor of THE LANCET.*

SIR.—You will have seen a report published in the *Times* that my private room in the *Field* building had been officially visited under warrant from the War Office. Will you kindly grant me space to say briefly that this visit had no relation to any business of the *Field* newspaper and concerned only correspondence relating to a high explosive in which I am privately interested? I have stated the whole case in a long letter which the *Times* was good enough to print for me on Jan. 18th.

I am, Sir, yours faithfully,

THEODORE A. COOK.

Windsor House, Bream's-buildings, E.C., Jan. 18th, 1917.

## MASSAGE AND MEDICAL ELECTRICITY IN THE AFTER-TREATMENT OF CONVALESCENT SOLDIERS.

*To the Editor of THE LANCET.*

SIR.—I should like to emphasise particularly the efficacy of the following simple applications in the after-treatment of convalescent soldiers.

1. *Ionisation.*—Many of those cases in which the passage of shrapnel or bullets through a limb has produced considerable disorganisation of tissue, with resulting pain, stiffness, and weakness, are very greatly benefited by ionic medication. As a rule, sodium ions are useful for softening large hard scars, and iodine ions help in the absorption of fibrous masses; but in view of the fact that one often finds conditions suggestive of a slow infective process salicylic acid can often be employed with advantage as the ionising drug. A preliminary application of radiant heat will undoubtedly assist ionisation in many instances.

2. *Spinal galvanism.*—For a number of men suffering from the nervous irritability, hypersensitiveness, and indefinite muscular pains which are not infrequently met with in the convalescent stages of war neurasthenia, the descending galvanic current applied with the anode over the cervical spinal region and each foot placed in a small bath, and the baths both connected to the negative pole, gives excellent results. I have been struck by the way in which the men themselves have spoken appreciably of this treatment, which may be varied by using a combined galvano-faradic (or galvano-sinusoidal) current.

3. *Statio electricity.*—For the treatment of shell shock after the initial stages I cannot speak too highly of the static apparatus. Where there are irritability, restlessness, disturbed sleep, and headache, I have found simple charging—with the patient on an insulated platform connected to the negative pole whilst an electrode is adjusted to give a gentle head-breeze—an invaluable method.

May I also point out the desirability of medical men in general practice keeping in touch with various electro-

<sup>1</sup> Those practically interested will find a reference to systems in force in my essay, *The Prevention of Venereal Diseases* (Booksellers Co., 72, Ford-street, Liverpool, 2s. Id.).

therapeutic measures that are being successfully carried out in the treatment of the convalescent wounded, for it is certain that they will ultimately have to deal with a number of cases requiring treatment of this kind and it will be most unfortunate if these drift into the hands of unqualified "medical elec ricians."

I am, Sir, yours faithfully,

EDWIN L. ASH, M.D. Lond.,

Physician and Neurologist to the City of London  
Harley-street, W.  
Red Cross Hospital.

## THE LOCALISATION OF FOREIGN BODIES.

To the Editor of THE LANCET.

SIR.—In the hope that it may prove of use to anyone similarly situated to myself I venture to enclose a brief description of an adaptation of the Mackenzie-Davidson principle of localisation of foreign bodies which I devised for my own use. My X ray apparatus, which is one ordered by the Civil Administration of the Nyasaland Protectorate, was not equipped with a localiser of any description, and as there are practically no facilities for elaborate workmanship in Central Africa my own model is naturally rather a crude article.

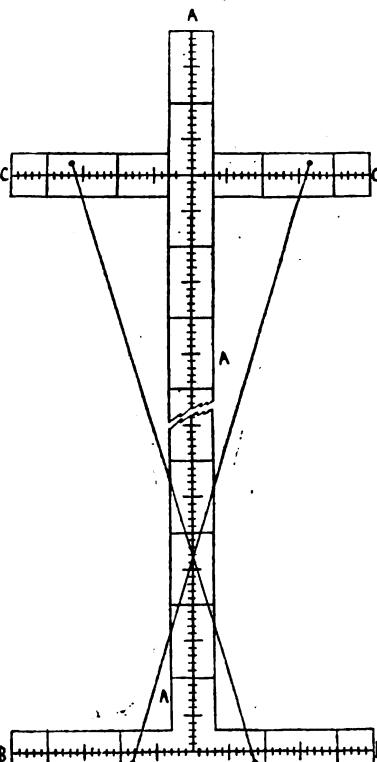
The apparatus is shown in the accompanying figure. It consists of a length of hard wood, A, 3 feet long, graduated on the face in inches and, or, centimetres. At the lower end is fixed a crossbar, B, 18 inches long, at right angles to A, and similarly graduated. A similar crossbar, C, is arranged to slide on A over its entire length. The centre line of B represents the plane of the X-ray plate, and that on C represents the plane of the tube-anticathode. After marking the skin directly over the incident ray by any of the usual methods, move the tube—say 3 inches—to the left of the centre position and expose the plate; then move the tube 3 inches to the right of the centre position—that is, 6 inches in all—and make a second exposure on the same plate, thus obtaining two shadows of the foreign body on the one plate. Now set the centre line of crossbar C at a distance from the centre line of crossbar B equal to the distance of anticathode from the plate. Measure the distance between the two shadows on the plate—say this is 3 inches. Now by setting the two threads on C from 3 inches to the right and left of the centre line of A, representing the traverse of the tube, to 1½ inches to the left and right of the centre line of A on B, representing the distance between shadows, the depth from the plate, of the foreign body can be read off direct by noting where the threads cross the centre line of A. The threads shown in the figure are fastened by means of drawing-pins.

This method will be found simple, rapid, and sufficiently accurate for all but the most delicate of work. The illustration is not drawn to scale, but will serve to illustrate the principle of operation.—I am, Sir, yours faithfully,

PERCY PERROW,

Lieutenant, S.A.M.C.; Radiologist, Nyasaland Field Force.

Dec. 8th, 1916.



## The War.

### THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue:—

#### Died.

Surgeon C. E. Reckitt, R.N., was a student at Guy's Hospital, London, and qualified in 1913. He had held appointments at Guy's and at the Royal Infirmary, Hull.

#### Wounded.

Capt. F. B. Simpson, R.A.M.C.

Capt. W. D. Reid, R.A.M.C., attached Manchester Regiment.

Capt. C. M. Forster, R.A.M.C., attached Yeomanry.

### THE HONOURS LIST.

The following promotions of and awards to medical officers are announced:—

#### G.C.B.

Surg.-Gen. Sir A. Keogh, K.C.B. (ret. pay).

#### K.C.B.

Surg.-Gen. W. Donovan, C.B. (ret. pay); Col. (temp. Surg.-Gen.) N. H. Howse, V.C., C.B., Australian A.M.C.

#### C.B.

Surg.-Gen. W. W. Kenny (ret. pay); Col. E. North (ret. pay). A.M.S.; Col. W. H. Horrocks, A.M.S.; C. I. D. J. MacKintosh, M.V.O., A.M.S. (T.F. Res.); Col. C. C. Reilly, A.M.S.; Col. J. Thomson, A.M.S.; Surg. Lt.-Col. P. J. Freyer, ret'd, I.M.S.; Lt.-Col. T. H. Openshaw, C.M.G., R.A.M.C. (T.F.); Lt.-Col. H. G. Barling, R.A.M.C. (T.F.); Lt.-Col. H. Davy, R.A.M.C. (T.F.); Temp. Lt.-Col. Sir T. Myles, R.A.M.C.; Temp. Lt.-Col. Sir W. A. Lane, Bart., R.A.M.C.; Temp. Lt.-Col. J. Swain, R.A.M.C.; Temp. Lt.-Col. W. A. Turner, R.A.M.C.; Temp. Lt.-Col. Sir B. G. A. Moynihan, R.A.M.C.; Temp. Lt.-Col. (temp. Col.) R. Jones, R.A.M.C.

#### K.C.M.G.

Surg.-Gen. G. D. Bourke, C.B. (ret. pay).

#### C.M.G.

Lt.-Col. W. W. Pope, late R.A.M.C.; Lt.-Col. G. E. Twiss (ret. pay), late R.A.M.C.; Lt.-Col. H. E. B. Bruce-Porter, R.A.M.C.; Lt.-Col. G. B. Stanisic, R.A.M.C.; Lt.-Col. (temp. Col.) R. S. H. Fuhr, D.S.O., R.A.M.C.; Lt.-Col. (temp. Col.) H. P. W. Barrow, R.A.M.C.; Temp. Hon. Lt.-Col. J. L. Thomas, C.B., R.A.M.C. (Maj. ret. T.F.); Maj. G. L. Guilland, R.A.M.C.; Col. Hon. W. B. Collins, New Zealand Medical Corps.

#### To be Brevet Colonels.

Lt.-Col. H. A. Baines, R.A.M.C.; Lt.-Col. C. J. Jaomb-Hood, 2nd Easter General Hospital, R.A.M.C. (T.F. Res.).

#### To be Brevet Colonel on R-tred List.

Lt.-Col. A. W. Browne (ret. pay), late R.A.M.C.

#### To be Brevet Lieutenant-Colonels.

Maj. (temp. Lt.-Col.) B. A. Craig, R.A.M.C.; Maj. F. McLennan, R.A.M.C.; Maj. (temp. Lt.-Col.) A. H. Safford, R.A.M.C.; Maj. (temp. Lt.-Col.) C. R. S. Bradley, R.A.M.C., commanding Training Centre.

#### To be Brevet Majors.

Capt. A. E. G. Fraser, R.A.M.C.; Capt. (temp. Maj.) B. W. D. Leslie, R.A.M.C.

#### Military Cross.

Capt. H. V. Stanley, R.A.M.C.

### MENTIONED IN DESPATCHES.

Lieutenant-General the Hon. J. C. Smuts, K.C., Commander-in-Chief of the East African Forces, in a lengthy despatch dealing with the campaign in East Africa since March last, says: "The work of the medical units has been very heavy, and all ranks have done their utmost in their care of sick and wounded, and in arranging for their speedy evacuation."

### OBITUARY OF THE WAR.

#### RODERICK CAMPBELL MCLEOD, M.D. NEW YORK, LIEUTENANT-COLONEL, CANADIAN ARMY MEDICAL CORPS.

The death of Lieutenant-Colonel R. C. McLeod occurred at Bramshott Camp, Jan. 4th, under conditions both tragic and startling. He succumbed, after 24 hours' illness, to an anthrax infection communicated by a shaving-brush through a trifling razor abrasion on the face. Colonel McLeod was a Nova Scotian, a Scotch Highlander by extraction and very near in instincts and character to the parent stock. He was born in Cape Breton Island in 1867 and practised his profession in his native island. In December, 1915, he gave up his private work and went to Halifax to offer himself to the Canadian Army Medical Corps. When the University of St. Francis Xavier, a Catholic University in Nova Scotia, proposed offering a medical unit to the Government, he was selected to forward the project and afterwards to command the unit. It was known as No. 9 Stationary Hospital, C.E.F. In October of last year Colonel McLeod, with his unit, took charge of Bramshott Military Hospital, and to the discharge of this duty he was giving his best endeavours when the fatal accident occurred.

**DEATHS AMONG THE SONS OF MEDICAL MEN.**

The following sons of medical men must be added to our lists of those who have fallen during the war:—

**Private W. N. Archibald**, Royal Fusiliers, elder son of Major W. N. Archibald, R.A.M.C.  
**Capt. L. Porter**, Royal Flying Corps, son of Capt. D. Porter, R.A.M.C.  
**Capt. O. C. Ward**, Indian Infantry, second son of the late Major E. C. R. Ward, R.A.M.C.  
**Private P. B. Barlow**, Grenadier Guards, youngest son of Sir T. Barlow, Bart., K.C.V.O., late President of the Royal College of Physicians of London, of Wimpole-street, London.  
**Surgeon C. E. Reckitt**, R.N., elder son of Colonel J. D. T. Reckitt, R.A.M.C.

**RED CROSS WORK IN THE COUNTY OF LONDON.**—The December report of the work done by the London Divisions of the Red Cross Society makes very satisfactory reading, though there is still need for more adequate provision for training in Red Cross subjects. Of 112 candidates examined during the month 26 failed in first-aid, 22 in home nursing, and 2 in hygiene and sanitation, the greater number of passes being in first-aid—namely, 273. Owing, perhaps, to press of work, local secretaries do not in some cases supply their reports as promptly as the smooth working of the organisation demands. To meet this and other difficulties arrangements are being made to inspect systematically the work of each division.

**THE WELFARE OF WOMEN WORKERS.**—At the Mansion House on July 22nd the Lord Mayor presided at a meeting organised by the Young Women's Christian Association with the object of providing rest and recreation huts for women employed in munition works. Dr. Addison, in appealing for funds, said that Feb. 27th would be a Woman's Day in London, and he hoped that the large sums of money which were much needed for the work which the Young Women's Christian Association was organising would be forthcoming. It had been proved, he said, that there were few occupations that women were not capable of entering and already 900,000 women were acting as substitutes for men in the industrial work of the country, 500,000 being engaged in the production of munitions, a number which was increasing by 34,000 a month. He believed that the work undertaken by the Young Women's Christian Association, properly handled and wisely administered, would provide a basis for an organisation that would endure after the war and come to be regarded as an essential concomitant of our industrial life.

**SCOTTISH WOMEN'S HOSPITALS: CALCUTTA UNIT.**—As a result of a collection inaugurated on St. Andrew's Day a donation of £13,000 has been sent from Calcutta to the offices of the Scottish Women's Hospitals, 2, St. Andrew-square, Edinburgh, for the equipment and maintenance of a Calcutta unit.

**REST-HOUSE FOR SAILORS AND SOLDIERS.**—Major-General Sir Francis Lloyd, in opening the St. Peter's Rest House for Soldiers and Sailors on Jan. 22nd at 4, Eccleston-square, S.W., referred to the difficulties of the authorities in finding accommodation for sailors and soldiers derelict in London, and paid a warm tribute of praise to the public institutions which had provided the necessary accommodation. Societies such as the Young Men's Christian Association, the Church Army, and the Salvation Army have now made available nearly 10,000 beds for men coming from the front.

**THE SUPPLY OF WINE TO THE FRENCH SOLDIER.**—It is stated that the French Government has requisitioned for the purposes of the Army a very substantial proportion of the vintage production. In France, therefore, wine has assumed a military importance, for no less than 200,000,000 gallons of wine from the country, together with 40,000,000 gallons from her Algerian colony, have been reserved for the use of the soldier. It would appear that each officer and man receives daily half a litre of wine. This allowance has been adopted since the war began, and the authorities are convinced that it has contributed to the health and efficiency of the troops through a campaign conducted under very trying conditions. The reasonable consumption of the wine of the country (*ein ordinaire*) is evidently regarded as beneficial rather than demoralising.

**Obituary.**

**DUNCAN BURGESS, M.A., M.B. CANTAB., F.R.C.P. LOND.,**  
 PROFESSOR OF MEDICINE IN THE UNIVERSITY OF SHEFFIELD AND  
 CONSULTING PHYSICIAN TO THE SHEFFIELD ROYAL INFIRMARY.

We regret to announce the death of Dr. Duncan Burgess, which took place at his residence in Sheffield on Jan. 17th.

Born at Grantown-on-Spey in 1850, Duncan Burgess received his early academic training at the University of Aberdeen, where, at an early age, he took the degree of Master of Arts. Proceeding to Cambridge, he became 13th Wrangler in 1875, and later was elected a Fellow of Corpus Christi College. Adopting then a medical career, in 1882 he became M.B. Cantab., obtaining, five years later, the Membership, and in 1905 the Fellowship, of the Royal College of Physicians of London.

He came to Sheffield in 1887, and was for many years physician to the Sheffield Royal Hospital, retiring as senior physician on reaching the age-limit in 1915. At Sheffield he occupied a prominent place in the academic world. He was for a long period lecturer on medicine at University College and later became professor of medicine in the University, while he was for some years the energetic secretary of the Sheffield Medico-Chirurgical Society. In 1890 he was deputed by the society, with Dr. W. S. Porter, to visit Germany and report on Koch's tuberculin treatment, and in 1899 was President.

At the outbreak of war he was mobilised with the rank of Lieutenant-Colonel, and acted for nearly two years as officer in charge of the Medical Section of the 3rd Northern General Hospital (T.F.). There is no doubt that the arduous work in connexion with his military duties brought on the fatal illness.

A personal friend writes:—

By the death of Dr. Duncan Burgess the profession in Sheffield has lost a loyal friend and an able and gifted colleague. To the younger men in the profession he never failed when the opportunity arose to hold out a helping hand. To all he was genial and kindly, and he succeeded in winning the affection in no small measure of patients and colleagues alike. In his profession a deep reader and keen critic, beyond it he possessed a wide knowledge of literature and a sympathetic interest in men and affairs. A great raconteur, a great lover of his native Scotland, an ideal host—for these things, hardly less than for his professional attainments, he was esteemed by those who knew him.

**GEORGE MUNRO SMITH, M.D. BRISTOL (HON. CAUSA)**  
 LIEUTENANT-COLONEL, R.A.M.C. (T.); CONSULTING SURGEON TO  
 BRISTOL ROYAL INFIRMARY.

Dr. Munro Smith, who died at his home in Clifton on Jan. 13th after a long and painful illness, was in his sixty-first year. He was the son of a surgeon, and was educated at Clifton College and University College, London, returning to Bristol after obtaining the Conjoint Board qualification, where he was in succession medical tutor, demonstrator of physiology, and demonstrator of morbid anatomy. In 1893 he accepted the chair of physiology at Bristol University College, and in this capacity was one of the pioneers in the formation of the University of Bristol, which recognised his services by making him honorary M.D. in 1912. From 1883 he occupied public surgical posts, first at the Orthopaedic Hospital, then at the Royal Infirmary, where he became full surgeon in 1897, and Clifton Dispensary. Outside his many teaching appointments Dr. Munro Smith was active as President of the local branch of the British Medical Association, of the Bristol Naturalists' Society, and for a time of the Medico-Chirurgical Society. His many-sided career brought him into intimate relation with his colleagues, among whom, and especially the undergraduates, he was a popular figure.

**THE LATE MR. C. M. BRADY.**—Mr. Charles Matthew Brady, L.R.C.S.I., who died with tragic suddenness on Jan. 19th on his way to the Wigan Infirmary, where he was consulting surgeon, was one of the best known medical men in the Wigan district. After qualifying in Dublin he was for a short while in practice in Oxford before making his home for 35 years in the Lancashire manufacturing town. Mr. Brady was a member of the Borough Insurance Committee and sat for some years on the School Board. He was aged 62 years and leaves a widow and three children.

## Medical News.

**ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH,  
ROYAL COLLEGE OF SURGEONS OF EDINBURGH, AND ROYAL  
FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.**—  
The examinations of this Board were concluded at Edinburgh  
on Jan. 20th, with the following results:—

### FIRST EXAMINATION.

Sayed Chaleb and Arthur Henry Jacobs.

*Physics.*—Catherine Millar, John Morrison McCubbing, Alexander Clon Thom, Robert Charles Dow, James MacClashan, and John Lister Redcliffe Ross.

*Biology.*—Robert Charles Dow.

*Chemistry.*—John Morrison McCubbing.

### SECOND EXAMINATION.

Andrew Wood Smith, Gwilym ap Vychan Jones, Thomas Richard O'Keeffe Alexander Forsyth Caddell, George Michie Raeburn, Norman Joseph Patterson, Thomas Hall James Douglas, and Jagindra Kumar Sen.

*Anatomy.*—Robert Berry Forgan, Janet Adeline Agnes Sang, Lizzie Robertson Clark, and Thomas Arnoldus du Toit.

*Physiology.*—William Harvie Kerr and Walter Granville Carew.

### THIRD EXAMINATION.

Hugh Emile Colman Collins, William O'Gorman Donoghue, Cecil Stuart Baxter, Andrew Francis Brighten, Hassan Amin Madwar, John Kohler Steel, and Arthur Stanley Hughes.

*Materia Medica.*—Eduard Louis Adendorff, John Vaughan Griffith, Jung Bahadur Singh, Thomas Blaney, and John Haldane Bain.

### FINAL EXAMINATION.

The following candidates having passed the Final Examination were admitted L.R.C.P. Edin., L.R.C.S. Edin., L.R.F.P. & S. Glasg.:—

William Fidler Mason, John Alexander Tolmie, James Wallace Gordon, Robert Frederick Claude Hamilton Buchanan, Alfred Black, Yeshwant Narayan Kadam, John Berry, Alfred David Gorman, and Wendell Thomas Garretson.

*Medicine.*—Russell Nelham Burton, Frederick Joseph Jack, Mary Gray Jones, and Jackson Baird Minford.

*Surgery.*—Don Adrian Jayasinghe.

*Midwifery.*—Benjamin Ajayi-Young, Robert Cloag Battersby, Alfred Edwin Elliott, Frederick Joseph Jack, and George Alexander Grandsoult.

*Medical Jurisprudence.*—Albert Ernest Hempleman, Allan Paul McLeod, Robert Pollok, Joseph Michaelson, Arukatti Patabendige Frederick Abeyasuriya, John Lavens West, Andrew Inglis Meek, Donald Stewart, Frederick Joseph Jack, and Daniel Cornelius Howard.

IN order to increase the amount of barley, sugar, and other brewing ingredients available for food, Lord Devonport has proposed a further restriction of the output of beer to 70 per cent. of the present output, that is to say, to 50 per cent. of the pre-war figure. The War Cabinet has approved the proposal, and decided on a corresponding restriction on the release of wines and spirits from bond. A Bill confirming this decision will be introduced in the coming session of Parliament.

A SPECIAL introductory medical course in physics, chemistry, and biology for students desirous of beginning their medical studies will be held at University College, London, and will begin on March 1st. Intending students should communicate forthwith with the secretary, University College, Gower-street, London, W.C.

THE Council of the London and Counties Medical Protection Society, Ltd., at their meeting on Jan. 17th, decided to apply for £9,500 £5 per cent. War Loan (£2100 new money), bringing the amount of the society's investment in war securities up to £10,000.

**ROYAL SOCIETY OF ARTS.**—On Tuesday afternoon next, Jan. 30th, a paper on Imperial Industries After the War will be read by Mr. Octavius C. Beale, Representative and Past-President of the Australian Associated Chamber of Manufacture, to the Colonial Section of the Society. The chair will be taken at 4.30 o'clock by Mr. Long, Secretary of State for the Colonies.

**CENTRAL MIDWIVES BOARD.**—A meeting of the Central Midwives Board was held at Queen Anne's Gate Buildings, Westminster, on Jan. 18th, with Sir Francis H. Champneys in the chair. Correspondence was considered with the matron of an institution recognised by the Board as a training school for midwives with reference to the examination schedules of two candidates on whose behalf she had signed the certificates of training certifying that they had undergone a course of training in midwifery extending over a period of six months, when in fact their training had then extended over a period of less than five months, as she well knew. The Board decided that the institution be informed that the Board takes a very serious view of the signing of untruthful certificates; that in the present case there is no question that the action of the matron was due to an "oversight" or that "it was unintentional"; that the Act of Parliament (Sect. XII.) provides penalties

of 12 months' hard labour for this offence; that the offence is aggravated by the fact that the institution is one from which the Board might have expected a high standard of honour; that the Board, in view of the gravity of the offence, postpones judgment until its next session.—A letter was considered from the town clerk of Middlesbrough enclosing a copy of a communication addressed by the coroner of Middlesbrough to the medical officer of health, stating that at an inquest held by him on Oct. 12th, 1916, on the body of a new-born child, the jury had added a rider to their verdict expressing the view that a midwife should not be allowed to notify as stillborn a child born before her arrival in a case where no registered medical practitioner was in attendance at the time of birth. The Board decided that the town clerk of Middlesbrough should be thanked for his letter, and be informed that the Board has noted the suggestion conveyed in the rider of the coroner's jury for consideration on the next revision of the Rules.—At a special meeting of the Central Midwives Board held on Jan. 19th, a number of midwives were struck off the Roll for various charges.

**CENTENARIANS.**—On Jan. 17th, the 100th anniversary of his birth, Mr. David Lewis, a liveryman and pensioner of the Glaziers' Company and the oldest City pensioner, was presented by the Company with a framed and illuminated copy of a resolution of congratulations passed by the Court at its last meeting, together with a gift of one hundred crowns. Mr. Lewis, who lives at Seven Kings, enjoys good health.—The King has sent a telegram of congratulation to Mrs. Arthur Mozley, of Malvern View, Cheltenham, who has completed her 102nd year.—Mrs. Ann Morrison, of Gairloch, has just completed her 103rd year.

**MEMORIAL TO THE LATE MR. R. L. SWAN.**—A committee has been formed to collect subscriptions to found a memorial to the late Robert L. Swan, Past-President of the Royal College of Surgeons in Ireland, and for many years surgeon to Dr. Steevens' Hospital and to the Orthopaedic Hospital. The latter institution he helped to found in 1876. The precise form of the memorial has not yet been decided upon, but it is intended that it should be associated with the two institutions to which he had devoted so much of his life. The honorary secretary and treasurer of the memorial fund is Dr. T. Percy C. Kirkpatrick, of 11, Fitzwilliam-place, Dublin.

## Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.

**CAMPBELL, MALCOLM, M.D. Glasg.**, has been appointed Medical Officer of Health for Droitwich.

**GALE, A. K., L.R.C.P., M.R.C.S.**, Consulting Medical Officer, and **LUTHER, S., Assistant Resident Medical Officer** to the Coalbrookdale Bierlow Union.

**HARRIS, H. G., M.D. Durh.**, one of the Medical Referees under the Workmen's Compensation Act, 1906, for County Court Circuit No 51.

**JACKSON, W., M.D. Brux.**, F.R.C.P.S. Glasg., Medical Officer for the Nelson Medical District by the Burnley Board of Guardians.

**PENNINGTON, LOUISE A.**, House Surgeon at the Wolverhampton General Hospital.

**PERRY, S. H., M.R.C.S., L.R.C.P. Lond.**, Temporary Medical Officer of Health for Spalding.

## Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).

When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

**BARNESLEY, BECKETT HOSPITAL AND DISPENSARY.**—House Surgeon. Salary £200 per annum, with board, &c.

**BATH, EASTERN DISPENSARY.**—Resident Medical Officer. Salary £140 per annum, with furnished rooms, &c.

**BATH, WINSLEY SANATORIUM.**—Assistant Resident Medical Officer. Salary £250 per annum, with board, &c.

**BIRMINGHAM CITY.**—Female Doctor for Infant Welfare Work. Salary £350 per annum.

**BIRMINGHAM CITY EDUCATION COMMITTEE.**—Temporary Assistant School Medical Officer. Salary £300 per annum.

**BRISTOL GENERAL HOSPITAL.**—House Surgeon for six months. Salary at rate of £175 per annum, with board, &c.

**BRITISH RED CROSS HOSPITAL, Netley.**—Pathologist, Junior Operating Surgeon, and Radiographer.

**CAMBRIDGE, ADDENBROOKES HOSPITAL.**—Honorary Assistant Surgeon in Out-patients' Department.

**CHESTERFIELD AND NORTH DERBYSHIRE HOSPITAL.**—Second House Surgeon. Salary £200 per annum, with board, &c.

**COVENTRY EDUCATION COMMITTEE.**—Temporary Assistant School Medical Officer. Salary £250 per annum.

**ESSEX, ADMINISTRATIVE COUNTY.**—Tuberculosis Officer. Salary £500 per annum.

**GRIMSBY AND DISTRICT HOSPITAL.**—House Surgeon. Salary £5 5s. per week, with board, &c.  
**HOSPITAL FOR SICK CHILDREN,** Great Ormond-street, London, W.C.—House Surgeon, Assistant Casualty Medical Officer, and House Physician, unmarried. Salary at rate of £60 per annum each, with board, &c.  
**EVAMINGTON SPA, WARWICKSHIRE AND SOUTH WARWICKSHIRE GENERAL HOSPITAL.** Second Resident Medical Officer. Salary £200 per annum, with board, &c.  
**NOTTINGHAM AND MIDLAND EYE INFIRMARY.**—Female House Surgeon. Salary £120 per annum.  
**PORTREE,** Island of Skye.—Parish Medical Officer and Public Vaccinator. Salary about £480 per annum.  
**ROYAL FREE HOSPITAL,** Gray's Inn-road, W.C.—Radiographer and Medical Electrician.  
**SCOTLAND, NAVAL AUXILIARY HOSPITAL.**—Assistant Surgeon and Medical Officer. Salary £1 per day, with board, &c.  
**SHEFFIELD UNION HOSPITAL, FIFVALE.**—Female Resident Assistant Medical Officer. Salary £250 per annum, with rations, &c.  
**STAFFORDSHIRE, WOLVERHAMPTON, AND DUDLEY JOINT COMMITTEE FOR TUBERCULOSIS,** MOXLEY SANATORIUM, near Wednesbury, Staffs.—Resident Medical Officer. Salary £350 per annum, with board, &c.  
**STANNINGTON, NORTHUMBERLAND, CHILDREN'S SANATORIUM.**—Female Resident Medical Officer. Salary £200 per annum, with board, &c.  
**SUNDERLAND ROYAL INFIRMARY.**—Female House Surgeon. Salary £150 per annum, with board, &c.  
**UNIVERSITY OF LONDON.**—External Examiners.  
**WEST HAM UNION SICK HOME,** 95, Forest-lane, Forest Gate, E.—Resident Assistant Medical Officer. Salary £300 per annum, with usual residential allowances.  
**WIGAN, ROYAL ALBERT EDWARD INFIRMARY AND DISPENSARY.**—Resident Surgical Dresser.  
**WILTS COUNTY COUNCIL, GENERAL EDUCATION COMMITTEE.**—Assistant Medical Officer as School Oculist. Salary £360 per annum, &c.

**THE Chief Inspector of Factories, Home Office, London, S.W.,** gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Bridport, Dorset; Wells, Somerset; and Chester-le-Street, Durham.  
**THE Secretary of State for the Home Department, Whitehall, S.W.,** announces a vacancy for a Medical Referee under the Workmen's Compensation Act, 1906, for County Court Circuit No. 4.

## Births, Marriages, and Deaths.

### BIRTHS.

**BARROW.**—On Jan. 4th, at Blahopton, Lochgilphead, Argyll, the wife of Surgeon Murray Barrow, R.N., of a son.  
**BROWN.**—On Jan. 12th, at Kasauli, Punjab, India, the wife of H. C. Brown, Major, I.M.S., of a daughter.  
**HALE.**—On Jan. 19th, at Cambridge-square, W., the wife of E. H. V. Hale, M.B., of a daughter.  
**KENDREW.**—On Jan. 16th, at Bedford-square, W.C., the wife of Mr. Dudley Kendrew, F.R.C.S., of a daughter.  
**WILSON.**—On Jan. 15th, at Rutherford-road, Balham, the wife of Maurice O. Wilson, Captain, R.A.M.C., of a daughter.

### MARRIAGES.

**NICHOLLS-BARRY.**—On Jan. 20th, at St. Margaret's, Westminster, T. B. Nicholls, Lieutenant-Colonel, R.A.M.C., to Margaret, eldest daughter of Walter Barry, of Sutton, Surrey.  
**SMYTHIE WOOD.**—On Jan. 16th, at the Parish Church, Clifton, Gerald Arthur Smythe, Captain, R.A.M.C., to Sarella Mary Mackenzie, third daughter of Mr. and Mrs. Robert Ley Wood, formerly of Cheltenham.  
**WICKRACK-HUNTER.**—On Jan. 17th, at St. Stephen's Church, Perth, Stanley Wickrack, M.R.C.S., L.R.C.P. Lond., Captain, R.A.M.C. (S.R.), to Mary Stewart, daughter of Mr. and Mrs. Robert Hunter, of St. John's, Perth.

### DEATHS.

**BURGESS.**—On Jan. 17th, at 442, Glossop-road, Sheffield, Duncan Burgess, M.B., F.R.C.P., aged 88 years.  
**HUGHES.**—On Dec. 18th, 1916, in Northern Assam, David E. J. S. Hughes, M.R.C.S., L.R.C.P. Lond., aged 30 years.  
**MEIKLE.**—On Jan. 22nd, at Edinburgh, Thomas Christopher Meikle, Fleet-Surgeon, R.N. (retired).  
**RECKITT.**—On Jan. 20th, at Royal Naval Hospital, Haslar, Charles Edward Reckitt, Surgeon, R.N., aged 30 years.  
**N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.**

### METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)  
 THE LANCET Office, Jan. 24th, 1917.

Date.	Main-fall.	Solar Radio in Volts.	Maxi- mum Temp. Shade.	Mis. Tem.	Wet Bulb.	Dry Bulb.	Remarks.
Jan. 18		42	39	34	34	35	Overcast
" 19	0°03	39	39	35	38	37	Raining
" 20	...	35	35	33	33	33	Raining
" 21	...	34	34	33	34	34	Overcast
" 22	...	37	36	31	32	32	Overcast
" 23	...	43	35	32	31	32	Cloudy
" 24	...	37	33	31	31	32	Snowing

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

## Notes, Short Comments, and Answers to Correspondents.

### THE ORGANISATION OF THE MEDICAL PROFESSION FOR WAR.

WE have received from Mr. K. M. Beavis, B.A., assistant secretary to the National Medical Union, 346, Strand, London, W.C., the following statement on the instruction of the Chairman of the Council of the Union :—

In view of the somewhat alarmist and as they think misleading statements appearing in the press on the above subject, the Council of the National Medical Union at their meeting held on Saturday, Jan. 13th, considered the alleged difficulty in meeting the medical needs of the country, both civil and military. The term "mobilisation" in the sense of the suggestions so far made appears to be synonymous with the conscription of a particular body of citizens who are more than warned that any lack of spontaneous alacrity on their part in offering their services for disposal according to the wisdom of a certain Central Medical War Committee will be followed by compulsory legislation, and the ousting of native by imported foreign medical service so far as the civil population is concerned. Considering the whole-hearted response to the country's need which has characterised the medical profession in this crisis, a response which has frequently entailed much personal sacrifice, this attitude towards it by the powers that be seems neither just nor wise, nor has it, in the opinion of the Council of the National Medical Union, the justification even of necessity if a proper use be made of the medical material available. This union, whose opposition to the Medical Benefit Section of the National Insurance Act is well known, has no desire to snatch any advantage for its views on this occasion, but it expects a like self-abnegation on the part of those interested in the maintenance of the system of medical benefit referred to.

The Council of the National Medical Union, after full discussion and after consultation with cognate bodies in other parts of the Kingdom, believes that every medical need, civil and military, may be met on the lines and upon the conditions hereunder indicated, and which should be operative during the war and for a reasonable period thereafter until the situation is again tending to become normal and the abstract questions at issue in the medical world can again be considered. They believe also that medical services secured on these conditions will be willing services, a paramount consideration in the exercise of a profession in which physical ease has largely to be sacrificed and mental activity with much responsibility displayed and borne.

The conditions indicated to secure such services are as follows : 1. A primary condition to be repeal of the Medical Benefit Section of the Insurance Acts, thereby releasing many doctors who are unevenly distributed at present and releasing a population that would automatically distribute itself in the district. 2. Non-panel practitioners offering to attend the patients of panel doctors not to be required to attend them except as private patients.

The statement adds that the importation of English-speaking doctors to attend the civil population is totally unnecessary and not in the national interests, and that compulsion in the case of the medical profession will only lead to disaster.

The Council further concludes that any voluntary organisation should be carried out by a properly constituted medical committee elected by, and representative of, the profession.

### PILEWORT.

To the Editor of THE LANCET.

SIR,—In reply to Mr. F. W. Alexander's inquiry in your issue of Jan. 6th I have prescribed pilewort ever since Sir James Sawyer recommended it 16 years ago, and I cannot say it has ever failed me when properly applied. The preparation I use is that of a double cone suppository, made like an elongated dumb-bell, which is easily inserted and retained in position when grasped by both the internal and external sphincters until it is entirely absorbed. The suppositories must be made from the fresh plant, and are prepared by Messrs. Lowe and Co., Limited, 8, Stafford-street, Old Bond-street, W. Mr. Lowe informs me that it is only for about one month in the year that the plant is really active, and he thinks it is neglect of the old botanists' instructions, to "gather the plant only at the height of its short active life" that accounts for so many failures with it. Doubtless the introduction of a host of modern synthetic remedies has had a good deal to do with the neglect of this and other valuable old remedies.

I am, Sir, yours faithfully,

Jan. 20th, 1917.

MAYFAIR.

## THE CONSERVATIVE TREATMENT OF BURNS AND SCALDS.

To the Editor of THE LANCET.

SIR.—I am convinced from long experience in the treatment of burns and scalds that many deaths are caused from the excessive care in cleaning the wounds, which tortures the patient, and the subsequent application of painful applications. The waste of bandages is also appalling. The verdict "Died of shock from burns" I take to be the result in many cases of the long-continued pain received during the dressing. My own practice is to relieve pain with opium, morphine, cocaine, &c., and to get the patient to sleep as soon as possible. The great heat of either fire or water that caused the injury has acted as a thorough disinfectant to the clothing, which need not be removed but simply covered with cotton-wool. A few days later the wounds are easily made clean and free from clothes. Treated in this way I have never lost a patient who was burned or scalded.

I am, Sir, yours faithfully,

Catford, Jan. 18th, 1917.

G. J. O'REILLY.

## JAMAICA HEALTH REPORT.

IN the section of the report for 1915-16 of the Governor of Jamaica (Sir W. H. Manning, K.C.M.G., C.B.) devoted to vital statistics and public health it is stated that the estimated population on March 31st last was 894,735. The birth-rate for the year was 34.6 per 1000 and the death-rate 21.6 per 1000, as compared with 38.9 and 21.4 respectively in the previous year. 66.9 of every 100 births registered were illegitimate. This is slightly higher than the rate—66.8 per cent.—in 1914-15, which was the highest island rate recorded since the compulsory registration of births commenced in 1878. Of the total mortality with the births during the year, 30,854 infants were born and 7089 died at 1 year of age or under, equal to 22.9 per cent.; the percentage under 5 years was 26.9.

Owing to the inability to obtain salvarsan for use in the treatment of yaws, the travelling dispensary and hospital established in 1914 with a view specially to the treatment of this disease was closed on June 12th, 1915. During the time the dispensary was in operation 1498 patients were treated for yaws, 408 of whom received two injections and 60 three injections. Of the patients treated 1109 were cured, 4 died, and 385 were under treatment at the time of the closing of the dispensary. The number of cases of yaws treated with salvarsan in the several public general hospitals and medical districts was 637. The Legislative Council in March voted a sum of £2500 for the purpose of providing for the special treatment in Kingston of venereal diseases, which are very prevalent, and in some places, inclusive of Kingston, appear to be on the increase.

There were 5942 cases of hookworm treated with thymol at the various country hospitals, in addition to 123 cases among East India immigrants on the estates and 142 prisoners so treated at the General Penitentiary. At the latter institution the treatment of the infection by oil of chenopodium was tried, and the surgeon reports that the results clearly demonstrate that the oil is exceedingly powerful against both hookworm and the large ascaris, and that no ill effects after dosing were observed in any case. The opportunity was taken during the year of studying, by examination of the faeces bacteriologically, the effects of thymol, quassia, and oil of chenopodium on cases from other institutions, and establishing a comparison of the respective efficacies of these drugs. The Government bacteriologist, Dr. H. H. Scott, states that the conclusions to be drawn from these experiments are: (1) that quassia is of very little, if any, use against hookworm; (2) that thymol is not an ideal specific; (3) that oil of chenopodium appears to be a very powerful anthelmintic, though further observations are still necessary to establish this point; and (4) that the best result is to be obtained by making use of both thymol and oil of chenopodium at a suitable interval; the problem of total eradication of ankylostomiasis is, however, not one to be solved by drugs only.

Vomiting sickness caused 134 deaths during the year, as against 196 in the previous year. The investigations by Dr. Scott in support of his theory that vomiting sickness is due to a poison contained in the fruit of ackees (*Bilighia sapida*) were continued. It so happened that while these investigations were being carried out there occurred a definite case of ackee poisoning, and Dr. Scott carried out a post-mortem examination, which revealed changes practically identical with those observed in the animals experimented upon. This case, which was not described as one of vomiting sickness, showed typically the onset, course, and pathological changes of that disease.

As a result of heavy rains malarial fever was prevalent throughout the island, and there was a great increase

among the peasantry and labouring classes; the number of cases admitted to the various hospitals (other than in Kingston) for malaria was 7138. The total number of patients treated in public general hospitals and asylums during the year was 29,537, and the number of outpatients treated was 67,882. There were 516 deaths in hospitals.

## GOOD MILK.

WE noticed in THE LANCET of Nov. 25th, 1916, p. 926, a small pamphlet on practical cow-keeping, written by the Hon. Mrs. Lionel Guest and published under the auspices of the Central Committee for National Patriotic Organisations. The complete book from which the pamphlet was compiled (*The Cow and Milk Book*, John Lane, pp. 175, price 1s. net) is now before us, and is a thoroughly useful little guide dealing with the cow in health and disease, the handling of milk, and the making of butter and cheese. Due stress is laid on the necessity of cleanliness, as well as of knowledge and common-sense, if this branch of farming is to be made profitable. Women, Mrs. Guest thinks, are particularly suitable for looking after live-stock, as farm animals respond to kind and sympathetic treatment. The book may well be commended to all who are keeping cows, or contemplate doing so.

## THE ABBÉ HUC ON PEDICULOSIS.

To the Editor of THE LANCET.

SIR.—Everybody at the present time is interested in lice, and I think the following means of keeping them off may be worth consideration. It is given by the Abbé Huc in his volume of "Travels in Tartary and Thibet," and is probably effective, though perhaps not as elegant a preparation as might now be devised.

Hunger and thirst, fierce winds and piercing cold, wild beasts, robbers, avalanches, menaced death, and actual discomfort—all had been as nothing compared with the incessant misery occasioned by these dreadful vermin. .... We bought a few rapeks' worth of mercury and made with it a prompt and specific remedy against the lice. You take half an ounce of mercury, which you mix with old tea-leaves previously reduced to paste by mastication. To render this softer you generally add saliva; water would not have the same effect. You must afterwards bruise and stir it awhile, so that the mercury may be divided into little balls as fine as dust. You infuse this composition into a string of cotton loosely twisted, which you hang round the neck. The lice are sure to bite at the bait, and they thereupon as surely swell, become red, and die forthwith. In China and Tartary you have to renew this sanitary necklace once a month, otherwise in these dirty countries you cannot possibly keep clear of these vermin.

I am, Sir, yours faithfully,  
Matlock, Jan. 22nd, 1917.

S. SHORE NIGHTINGALE.

## THE COMPLETE DIGESTION OF WAR BREAD.

Dr. William Bramwell (Liverpool) writes to us regarding a patient who is convinced, by an examination of his faeces, that he is passing undigested particles of so-called offal contained in the war bread. The patient, he says, while not in a position to say whether such particles in passing through the alimentary canal have given up all or any part of their nutrient before expulsion as waste, believes that his experience raises a question of vital importance with regard to the use of the R-bread. We have not overlooked the matter, and our correspondent will find an interesting reference to the subject in an annotation on whole-meal bread in THE LANCET of Dec. 2nd, 1916 (p. 949). Probably much less objection would be raised to the so-called offal (itself an objectionable term) if it were finely ground, as we think is likely to be the case in the modern milling processes. Whether fine milling is officially prescribed has not been publicly stated.

*Esculapius* would like to learn from medical men having experience of it whether the prophylactic use of vaccine against winter colds has been found efficacious and lasting. He would like to know whether the vaccines lose their effect after a time.

THE address of the London Insurance Committee is now Insurance-street, W.C. The street is in the Borough of Finsbury, and was originally named William-street, but this was altered a few months ago.

COMMUNICATIONS not noticed in our present issue will receive attention in our next.

The following journals, magazines, &c., have been received:—  
Interstate Medical Journal, British Journal of Surgery, British Journal of Dental Science, Review of Neurology and Psychiatry, Annales de Gynécologie et d'Obstétrique, American Medicine, Journal of the Royal Naval Medical Service, Clinical Medicine, American Journal of Surgery, Journal of Missouri State Medical Association, American Journal of Obstetrics, Journal of State Medicine, American Journal of Roentgenology, Mexican Review, &c.

## Medical Diary for the ensuing Week.

### SOCIETIES.

ROYAL SOCIETY, Burlington House, London, W.

THURSDAY.—Papers:—Sir Ronald Ross, K.O.B., and Miss H. P. Hudson: An Application of the Theory of Probabilities to the Study of *a priori* Pathometry. Part II.—Dr. J. Brownlee: An Investigation into the Periodicity of Measles Epidemics in London from 1703 to the Present Day by the Method of the Periodogram (communicated by Dr. W. M. Fletcher).—Capt. J. Hammond: On the Causes Responsible for the Developmental Progress of the Mammary Glands in the Rabbit during the Latter Part of Pregnancy (communicated by Mr. J. Barcroft).—Mr. F. H. A. Marshall and Mr. H. T. Halnan: On the Post-ovarous Changes occurring in the Generative Organs and Mammary Glands of the Non-pregnant Dog (communicated by Mr. J. Barcroft).

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

#### MEETINGS OF SECTIONS.

Friday, Feb. 2nd.

LARYNGOLOGY (Hon. Secretaries—Cecil I. Graham, Frank A. Rose): at 4 P.M.

Cases:

Dr. E. W. Scripture: (1) A Case of Speech without the Use of the Larynx; (2) Apparatus for the Graphic Record of Speech.  
Sir St Clair Thomson: (1) Three Cases after Laryngo-fissure of Carcinoma Laryngis; (2) Sections demonstrating Very Early Diagnosis of Carcinoma Laryngis; (3) (With Mr. Wilfred Trotter): A Case of Extrinsic Carcinoma Laryngis, Two Years after Operation; (4) Two Cases of Malignant Disease of Nasal Accessory Sinuses after Lateral Rhinotomy (Moure's operation).  
Mr. Cecil Graham: A Case of Malignant Disease of Nasal Accessory Sinuses after Lateral Rhinotomy (a modification of Moure's operation).  
Dr. Irwin Moore: (1) A Case of Carcinoma of Maxillary Sinus after Lateral Rhinotomy; (2) A Case of Choanal (Sphenoidal) Polypus in a Patient aged 6 years; (1) The Original Laryngeal Mirror used by Manuel Garcia.

Mr. Norman Patterson: A Case of Epithelioma of Naso-pharynx after Operation.

Dr. Jobson Horne: A Case of Choanal Polypus.

N.B.—Members of the Section of Surgery are specially invited to attend.

ANESTHETICS (Hon. Secretaries—F. H. Shipway, Ashley S. Daly): at 8.30 P.M.

Paper:

Capt. Geoffrey Marshall, R.A.M.C. (S.R.): Anesthetics at a Casualty Clearing Station.

ROYAL SOCIETY OF ARTS, John-street, Adelphi, W.C.

MONDAY.—4.30 P.M., Cantor Lecture:—Prof. A. B. Pite: Town Planning and Civic Architecture. (Lecture I.)

WEST LONDON MEDICO-CHIRURGICAL SOCIETY, West London Hospital, Hammersmith-road, W.

FRIDAY.—8.30 P.M., Pathological Evening.

**LECTURES, ADDRESSES, DEMONSTRATIONS, &c.**  
POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simson: Gynaecological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

ROYAL INSTITUTE OF PUBLIC HEALTH, Lecture Hall of the Institute, 37, Russell-square, W.C.

Course of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—

WEDNESDAY.—4 P.M., Lecture III.:—Dr. C. J. Macalister: The Prevention and Arrest of Venereal Disease in Men. General Sir H. L. Smith-Dorrien, G.C.B., G.C.M.G., D.S.O., Dr. F. N. K. Menzies, Dr. O. May, and Major A. Corbett-Smith, R.F.A., have promised to take part in the discussion.

ROYAL INSTITUTION OF GREAT BRITAIN, Albemarle-street, Piccadilly, W.

TUESDAY.—3 P.M., Prof. C. S. Sherrington: The Old Brain and the New Brain, and their Meaning. (Lecture III.)

THURSDAY.—3 P.M., Prof. F. G. Donnan: The Mechanism of Chemical Change. (Lecture I.)

### EDITORIAL NOTICES.

It is most important that communications relating to the Editorial business of THE LANCET should be addressed exclusively "TO THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET should be addressed "To the Manager."

We cannot undertake to return MSS. not used.

Offices: 423, STRAND, LONDON, W.C.

### MANAGER'S NOTICES.

#### VOLUMES AND CASES.

VOLUMES for the second half of the year 1916 will be ready shortly. Bound in cloth, gilt lettered, price 16s., carriage extra.

Cases for binding the half-year's numbers (inland edition) are now ready. Cloth, gilt lettered, price 2s., by post 2s. 4d. To be obtained on application to the Manager, accompanied by remittance.

#### ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the new year, the price was raised to 8d. The rates of subscription remain as revised in October.

#### TO SUBSCRIBERS.

Will Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C., are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and not to THE LANCET Offices.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

#### TO COLONIAL AND FOREIGN SUBSCRIBERS.

Subscribers abroad are particularly requested to note the rates of subscriptions given on page 4.

The Manager will be pleased to forward copies direct from the Offices to places abroad at the rates shown, whatever be the weight of any of the copies so supplied.

#### NEWSPAPERS FOR NEUTRAL COUNTRIES.

Newspapers are not at present being sent forward to neutral European countries unless posted direct from the office of publishers or newsagents who have obtained permission from the War Office for this purpose. The Publisher of THE LANCET has obtained the required permission, and he will forward copies direct from the Office to any neutral country on receipt of instructions.

#### Communications, Letters, &c., have been received from

A.—Dr. J. H. Ashworth, Margate; Mr. J. B. Aickin, Ferry Hill; Archives Médicales Belges, Adinkerke, Editorial Sec. of; Messrs. Allen and Hanbury, Lond.; Anglo-French Drug Co., Lond.; Capt. M. B. Arnold, R.A.M.C.; Associated Manufacturers Co., Lond.; Aymard Patent Milk Sterilizer Co., Ipswich.

B.—Mr. W. R. Barlow, Trinity; Messrs. Brady and Martin, Newcastle-on-Tyne; Mr. I. Bastow, Bournemouth; Boston Athenaeum Library, Librarian of; Messrs. Butterworth and Co., Lond.; Capt. C. O. Boyle, R.A.M.C.(T.); Messrs. W. H. Bailey and Son, Lond.; Messrs. B. Brown and Son, Huddersfield; Brighton and Sussex Medico-Chirurgical Society, Sub-Librarian of; Dr. P. Bartholow, New York; Boivill, Lond., Managing Director of:

C.—Mr. B. Clerra, Valladolid; Messrs. J. and A. Carter, Lond.; Messrs. Constable and Co., Lond.; Coventry Education Committee, Sec. of; Dr. G. Cooper; Capt. V. T. Carruthers, R.A.M.C.; Canadian Contingents, Director of Medical Services, Lond.; Mr. P. Creed, Lond.; Chicago School of Sanitary Instruction; Major

- R. Crochet; Mr. R. Creasy, Lond.; Dr. F. Clifford, Swansea; Messrs. E. Cook and Co., Lond.; Mr. H. A. Collins, Croydon; Sir Theodore Cook, Lond.; Dr. W. H. Coates, Partington; Col. J. Cantile, R.A.M.C.T.; Church of England Temperance Society, Lond., Sec. of; Capt. O. Carlyle, R.A.M.C.;
- D.—Mr. H. Dickinson, Lond.; Messrs. James L. Denman and Co., Lond.; Mr. R. Dacre, Lond.; Prof. K. H. Digby, Hong-Kong; Capt. J. S. Dunn, R.A.M.C.; Dr. G. K. Dickinson, Jersey City; Dr. J. Donald, Liskeard; Dr. L. W. Delchier, Philadelphia; Messrs. S. Drayton and Sons, Exeter.
- E.—Capt. J. Ewing, R.A.M.C.T., D.A.D.M.S.
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Hunterian Lecture

ON

THE BLADDER IN GUNSHOT AND OTHER INJURIES OF THE SPINAL CORD.

Delivered at the Hunterian Society,

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F.R.C.S. ENG.,

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MR. PRESIDENT AND GENTLEMEN.—My first words must be those of thanks to the Council of the Hunterian Society for the invitation to address you. I had no doubt as to my strong desire to accept the invitation, but I had very grave doubts as to whether, in the present time of great stress, when there is so little opportunity for quiet consideration and accurate writing, I was justified in undertaking so important a task.

Had this been a time of peace, my inclination in addressing a society, the patron-saint of which is John Hunter, would have been to select a subject in which surgical pathology has some considerable part. But this is war-time, and I see in the subject I have chosen an opportunity of bringing before you some war-work which I hope may have a certain practical value, since it is based upon personal observation of a class of cases never before collected together in such great numbers.

At the Star and Garter Hospital (65 beds) there have been altogether 111 cases, and with the exception of a very few these have been cases of spinal injury. In conjunction with my colleague, Sir David Ferrier, I have been responsible for the observation and treatment of the complications affecting the urinary organs in these cases. At the King George Hospital there have been since May, 1915, 339 cases of spinal injury in the wards of my medical and surgical colleagues on the staff and in the wards under my care at that hospital.

To all of these cases I have had free access, and I seize this opportunity of offering my grateful thanks to Lieutenant-Colonel R. J. C. Cottell, R.A.M.C., officer commanding, and to Lieutenant-Colonel Donald Armour, R.A.M.C. (T.), Major Newton Pitt, R.A.M.C. (T.), Captain Sir John Broadbent, Bart., R.A.M.C. (T.), Captain Farquhar Buzzard, R.A.M.C. (T.), Captain James Collier, R.A.M.C. (T.), and Dr. Raymond Crawford for the opportunities they have afforded me of studying the cases under their care. I would also acknowledge my indebtedness to Major H. J. Parry, R.A.M.C., D.S.O., and to Major J. L. Dickie, R.A.M.C., for obtaining statistics of cases at the King George Hospital and the Star and Garter respectively.

I propose to look shortly at the anatomy and physiology of micturition. Next I shall outline the recognised

No. 4875.

variations in micturition brought about by disease and injury of the spinal cord. Then will come consideration of the cases that have come under my observation, and, lastly, some discussion of the subject of treatment.

ANATOMY AND PHYSIOLOGY.

The centre which is credited with the control over the act of micturition lies in the lumbar enlargement of the cord. Nerves pass to the bladder in two groups—a lumbar group and a sacral group. (Figs. 1, 2.) The lumbar nerves issue from the cord in the third, fourth and fifth lumbar nerve-roots and pass through the sympathetic chain, without making connexion with the cells of the sympathetic ganglia, to the inferior mesenteric plexus. From these ganglia two hypogastric nerves pass to the hypogastric plexus. Thence filaments pass to the muscular wall of the bladder. The second group consists of two nerves derived from the second and third sacral nerves, and named the *nervi erigentes*. These two nerves pass straight to the hypogastric plexus, from which the fibres are distributed to the bladder. Ganglion cells are also found in the course of the nerve filaments in the muscular wall of the bladder. To these nerves may be added the pudic nerve (second, third, and fourth sacral) which supplies the compressor urethrae muscle, or external sphincter, and the perineal muscles. Recent investigators conclude that a cortical centre for the bladder is situated in the motor area, at the spot where the arm and leg centres join.

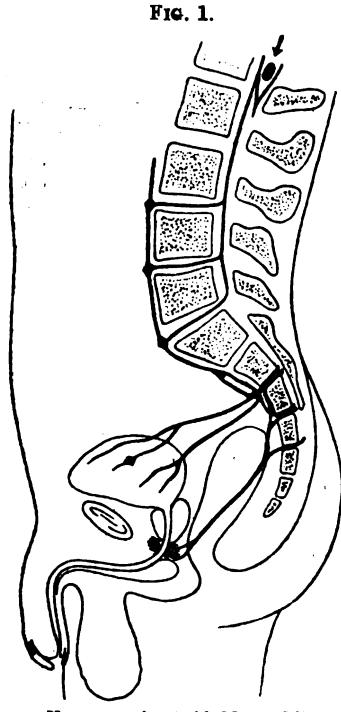
While the above is the generally accepted view, the work of Gaskell<sup>1</sup> shows that the centre for micturition lies outside the spinal cord, in the hypogastric and mesenteric plexuses of the sympathetic. Müller,<sup>2</sup> applying Gaskell's view,

states that after complete separation of the bladder from the cord reflex micturition still takes place. A final decision in this matter does not appear to have been arrived at. Bechterew, in commenting on this relegation of the micturition centre to a lower level, states that though it may be shown in animals, the spinal bladder centre is so highly developed in the human being that its destruction under any conditions is followed by an abolition of bladder contraction. Justschek<sup>3</sup> has shown in animals that the

bladder can contract spontaneously in virtue of the ganglia in its muscular wall.

*The Act of Micturition.*

The urine is retained in the bladder partly by mechanical conditions and partly by tonic contraction of the vesical sphincter. In the cadaver urine does not escape from the bladder when in the recumbent or the erect posture, and some amount of force is required to separate the elastic walls of the urethra at the vesical orifice. The male bladder is provided with a double sphincter, a non-striped or true sphincter, and a striped or external sphincter (compressor urethrae muscle). The non-striped sphincter has a constant involuntary action, but it is stated that some amount of voluntary control may be exerted over it.



Nerves passing to bladder and its sphincters.

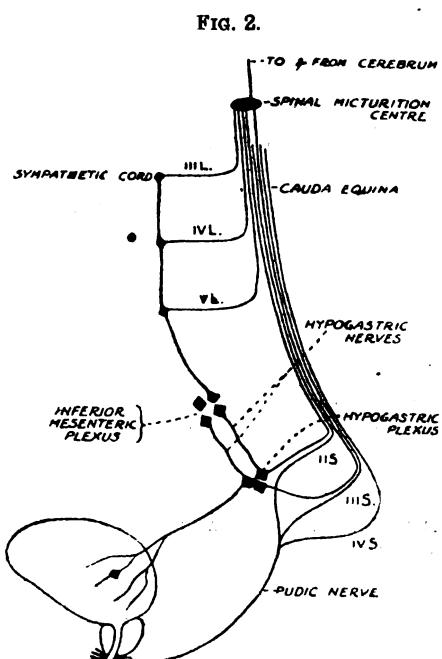


Diagram of nerves of bladder, explanatory of Fig. 1. III.L, IV.L, V.L, Lumbar nerve roots; I.I.S, II.I.S, III.I.S, IV.S, Sacral nerve roots.

Under ordinary conditions the urine is retained in the bladder by the tonic contraction of the true, or non-striped, sphincter. When, however, the pressure within the bladder becomes too great, and it is still desired to retain the urine, the true sphincter is reinforced by voluntary contraction of the external sphincter. Under certain circumstances the action of the true sphincter may be entirely abolished and the external sphincter will take its place. I pointed out<sup>5</sup> in 1905 that after the operation of suprapubic prostatectomy, in which the prostate and prostatic urethra are removed, the internal sphincter is inactive in the majority of cases, and the sphincter function is taken over by the striped compressor urethrae muscle.

Micturition takes place in response to impulses which pass along the reflex arc. Impulses originating in the bladder pass by the afferent nerves to the micturition centre, and from this two sets of impulses issue by way of the efferent nerves. One set exerts an inhibitory influence on the true sphincter and causes it to relax, and a second set of impulses pass to the muscular wall of the bladder (detrusor) and stimulate it to contract. The manner in which this reflex is initiated has given rise to some discussion. Two sensations are concerned: 1. As the bladder becomes filled with urine the tension of the fluid gradually increases, and the pressure exerted on the bladder wall causes increasing waves of contraction of the bladder muscle. 2. When the bladder is distended contractions of the wall become sufficiently strong to force a few drops into the sensitive prostatic urethra, from which impulses pass to the spinal centre, giving rise to efferent inhibitory impulses to the sphincter and motor impulses to the detrusor. In normal micturition both these factors probably have a place. Either may, however, alone produce the reflex act. The prostatic urethra is removed in the operation of suprapubic prostatectomy, and after the operation micturition is normally performed.<sup>6</sup>

*Cerebral control of micturition.*—The influence of the cerebral cortex on micturition is exerted in two ways. 1. A voluntary inhibition of the reflex of micturition becomes established in the child about the second year. Periodic reflex micturition, the natural state in the infant, no longer takes place, but the urine is retained until a convenient opportunity occurs, when the bladder is emptied voluntarily. When the bladder becomes distended so that the desire to micturate is strongly felt, the control becomes voluntary, and is exercised by contraction of the compressor urethrae or external sphincter, and also of the perineal muscles.

2. The voluntary part of the act of micturition consists in relaxation of the sphincter, contraction of the abdominal muscles, and the contraction of the bulbo-cavernosus muscle at the end of the act. Contraction of the abdominal muscles alone will not produce micturition, but increases the flow of urine, once micturition has commenced. Relaxation of the external sphincter is the voluntary part of the initiation of normal micturition in the adult, and this is probably sufficient in itself to induce the escape of urine into the prostatic urethra, and start the reflex act.

#### BLADDER STATES IN SPINAL INJURY AND DISEASE.

Before passing to consider the cases of nerve lesion affecting the bladder that have come under my observation, I will refer shortly to the bladder states that are recognised as the result of animal experiment and observation on cases of injury to, and disease of, the spinal cord.

1. *Retention of urine.*—Paralysis of the detrusor muscle, while the sphincter remains active, causes retention of urine. This condition, if prolonged, leads to retention with overflow. Less complete nerve lesions may produce delay in commencing micturition, a poorly projected stream, and dribbling at the end of micturition.

2. *Retention with overflow (passive incontinence).*—Relaxation of the bladder muscle permits the accumulation of a large quantity of urine (stated at 1½ litres, Bechterew). At length the intravesical tension becomes so great that some urine flows away. The bladder does not, however, empty itself; no reflex micturition takes place, but only the surplus beyond a certain large accumulation escapes. The condition has been looked upon as a passive incontinence, the bladder remaining entirely flaccid. Corner<sup>7</sup> suggests that in the moderately distended paralytic bladder rhythmic contractions continue and expel a few drops of urine every few minutes, but when the distension becomes greater the contractions cease and the overflow consists of drops of urine

mechanically displaced from the bladder by influx from the ureters.

3. *Periodic reflex micturition (active incontinence).*—Here a quantity of urine accumulates in the bladder, and then the reflex act of micturition takes place and the urine is discharged. When the same quantity of urine accumulates again the reflex act is repeated. The reflex micturition cannot be voluntarily controlled either by initiating the act, or by inhibiting it, or stopping it while it is taking place. Here the state is that of the infant's bladder, cerebral control being absent. This condition is developed where there is section of the cord at any part above the lumbar micturition centre.

4. *Paralytic incontinence.*—In this state there is a flaccid bladder and atonic sphincter, and the urine dribbles away from the bladder without accumulating. This is said to develop when the lumbar centres are destroyed, and the bladder is cut off from the cord altogether.

#### OBSERVATIONS ON CASES OF BLADDER LESION IN SPINAL INJURY.

While the large numbers of cases of spinal lesion already referred to have come under my observation, it has been impossible in the time at my disposal to make full notes for the purposes of statistics on all the cases. I have, however, obtained detailed notes on 70 cases, and have to thank my house surgeon, Dr. A. K. Selim, for valuable help in note-taking. The condition of the urinary tract is the most important clinical factor in these cases of spinal injury. Urinary infection may be a contra-indication to operation on the spine, or it may cause death soon after an operation. It may be fatal where operation has already given promising results, or where without operation the case is showing signs of improvement in the nerve lesion. There are many points of great interest and importance in regard to the urinary organs in these cases, but I shall only have time to discuss two of these—namely: (1) Variations in the function of micturition, and (2) infection of the urinary tract.

##### Variations in the Function of Micturition.

Two distinct stages were observed in the cases that have come under my notice: (1) A stage of complete retention; (2) a stage of periodic reflex micturition.

1. *Stage of complete retention.*—There is a stage of complete retention commencing from the time of the injury and lasting for a varying period of time. During this time there is atony of the detrusor muscle, but the sphincter remains active. As a result the bladder is distended with urine. Careful inquiry elicits that the bladder is emptied on an average from a half to two hours before the injury, so that it probably contains a small quantity of urine when the wound is received. The shock of the spinal injury must be very considerable, and it is unlikely that during the first 6 or 8 hours after that much urine is secreted. By the end of from 12 to 24 hours, however, a considerable amount of urine has accumulated. In the great majority of cases the patient is unconscious of the fact that the bladder is distended, but in a proportion of cases the distension is felt and causes acute pain.

After a time, if the retention is not relieved by catheter, urine begins to dribble away, the bladder remaining distended and the overflow escaping (retention with overflow). I have not been able to ascertain whether this escape of urine is a trickle of fluid from the urethra as a result of pressure from the natural resiliency of the bladder wall, or whether active contractions of the bladder take place.

The catheter is passed and the bladder emptied at a varying time after the wound was inflicted. From that time catheterisation is continued at more or less regular intervals. Between the times of catheterisation the bladder becomes distended with urine, but there is no longer any escape.

The duration of this state of complete retention varies in different individuals, the shortest that I have noted being 24 hours and the longest 18 months. The average duration in 30 cases was 55 days. In one case there was said to have been no retention, and periodic reflex micturition commenced immediately after the injury. In all the others of 70 carefully investigated cases, this stage of retention was, or had been, present.

2. *Stage of periodic reflex micturition (active incontinence).*—To the first stage of complete retention there succeeds, after days, weeks, or months, a second stage of periodic reflex

micturition, which, unless improvement in the spinal lesion takes place, is the permanent state of the bladder.

(a) *Transition stage*.—The bladder does not, however, suddenly pass from a condition of retention with overflow, or complete retention, to one of active incontinence in its fully developed form. There is a transition period in which the bladder is still distended, or partly distended, with urine, but active contraction of the bladder wall takes place, and expels a small quantity of urine at intervals. The commencement of this period is marked by the necessity for providing a bottle to receive the urine which is discharged at frequent intervals between the times at which the catheter is passed. Very frequently at this time the catheter is omitted, although it may still be passed once a day or oftener for the purpose of washing the bladder. The bladder, which at first was distended, left to itself gradually becomes more contracted, until the quantity of residual urine left after micturition is very small, or there is none at all. The advent of cystitis hastens the contraction of the bladder and reduces the quantity of residual urine.

(b) *Periodic reflex micturition*.—In the fully developed second stage the bladder is a purely reflex organ. The sphincter is active, and the urine accumulates in the bladder. When the set capacity of the bladder is reached the detrusor muscle contracts, the sphincter relaxes, and the urine is discharged in a powerful stream. This is active incontinence. It is an involuntary act. The patient is unable by any effort of will to initiate the reflex, nor can he inhibit the micturition. In the majority of cases he is unaware that micturition is taking place. The bladder holds from 2 to 10 ounces, and the urine is discharged at intervals of a quarter or half an hour up to two or three hours. Where severe cystitis is present the capacity is much diminished and the bladder holds only one or two ounces. When cystitis is mild or absent the capacity of the bladder is greater. Artificial distension of the bladder beyond its set capacity results in the fluid being discharged alongside the catheter, and the proceeding usually causes pain. Operation on the bladder in cases of severe cystitis in this stage showed the muscular wall thick, and the organ appeared to be in a permanent state of partial contraction. Cystoscopy in a number of cases in this stage showed chronic cystitis, but there was no trabeculation such as is found in the bladder in tabes.

#### *Bladder Sensation.*

The two varieties of sensation connected with the function of normal micturition are the sensation of distension and the urethral sensation which is felt in the prostatic urethra. In the cases of paraplegia under consideration the urethral sensation is more frequently and completely abolished than the tension sensation. The feeling of tension produced by an over-full bladder is preserved in greater or less degree in a fair number of cases. This may be felt for a time and then be abolished, or it may be the first sign of improvement taking place after being completely in abeyance for a prolonged period. The sensation is not so defined as in the normal individual unless recovery is far advanced. It amounts to a vague sensation of fullness somewhere in the abdomen, which in time the patient comes to connect with a distended bladder, the knowledge being checked by the patient feeling the distended bladder with the hand in the abdomen. Urethral sensation is abolished. The patient is unable to feel the urine passing or the catheter being introduced. In some cases, especially cases of cauda equina lesion and cases of partial cord lesion which are recovering, the passage of the catheter can be felt. The prostatic urethra, especially at the entrance into the bladder, is the sensitive part, the anterior urethra remaining anaesthetic.

#### *Variation in the Bladder Condition in Lesions at Different Levels.*

In the cases that have come under my observation there are examples of injury in all the regions of the cord.

In the cervical and dorsal region of the spine voluntary micturition was present in a few cases where the injury was slight. In all the other dorsal and cervical cases there was complete retention of urine when the injury was recent, and periodic reflex micturition when the date of the injury was more remote. The cases of periodic reflex micturition included those which I have described as in the transition stage—namely, periodic reflex micturition with incomplete

emptying of the bladder, and also those where the final stage of periodic reflex micturition had been reached by the bladder having regained the power of completely emptying itself. All the above cases represent lesions situated above the lumbar centre for micturition.

It is of interest to examine those cases where the upper part of the lumbar spine was involved in the injury, for at this level lies the micturition centre. There were three cases of injury involving the eleventh and twelfth dorsal and first lumbar vertebrae; one affecting the first lumbar, one the second lumbar. In two of these cases the nerve symptoms pointed to a partial lesion of the cord. In one of these voluntary micturition was performed, and in one of them there was periodic reflex micturition. In three of the cases the symptoms pointed to a complete lesion, and in each of these was periodic reflex micturition. In none of the cases was there any resemblance to the condition which has been described as following destruction of the lumbar centre in experimental work on animals—namely, paralytic incontinence, the urine dribbling away from a flaccid empty bladder through a flaccid sphincter. In one of these cases the lesion was verified by operation by Lieutenant-Colonel Armour, the cord being found "badly pulped" at the level of the twelfth dorsal and first and second lumbar vertebrae.

Lesions of the cauda equina were present in 14 cases examined. The effect of the nerve injury on the act of micturition showed remarkable variation. Three cases of partial lesion of the cauda equina passed urine voluntarily and normally. Eight cases of partial lesion had periodic reflex micturition, following a stage of complete retention. Two cases of partial lesion of the cauda equina had complete retention. One of these was in the early stage, two months only having elapsed since the injury. A second, a unilateral lesion, had complete retention for 18 months. One case had a complete lesion with retention.

Complete retention after the injury, followed by periodic reflex micturition at a later date, was the rule in these cases, as in those where the injury involves the cord. A feature of the cauda equina cases was variation, from time to time, in the functional state of the bladder. In three of the cases there were recurrent attacks of retention of urine lasting from a week to a month after reflex micturition had become established.

Periodic reflex micturition or active incontinence is generally accepted as the condition which results when the micturition centre in the cord is cut off from the control of the brain, such as occurs in supralumbar lesions. For its development the reflex arc, together with the spinal centre, is supposed to be intact. It is not conceivable in this theory that injury to the afferent or efferent nerves of the bladder, within or without the spinal canal, could bring about this state of micturition. Yet periodic reflex micturition has developed in these 8 cases of cauda equina lesion.

These cases of injury to the lumbar enlargement of the cord and to the cauda equina support the view of Gaskell, already referred to, that the centre for micturition does not lie in the spinal cord but in the hypogastric and mesenteric plexuses. Possibly they may give to the ganglion cells in the bladder wall a more important rôle than has been hitherto ascribed to them.

The most striking points in considering the variation in the effect of injuries at different levels on the act of micturition may be summarised. Complete retention occurs, at the commencement, in all cases where micturition is affected, at whatever level the injury may be, and it occurs in cauda equina lesions as well as in cord lesions. Periodic reflex micturition is the second phase in all lesions of the cord, not excepting those of the lumbar enlargement. Periodic reflex micturition develops in more than half the cases of cauda equina lesion, but occasionally voluntary micturition follows directly on a period of complete retention.

#### *Urinary Infection.*

The most common and most fatal complication in a paralysed bladder is infection. Over 90 per cent. of cases of spinal injury arriving at the Star and Garter Hospital have a serious infection of the urinary tract, and all cases have at some period passed through a stage of severe infection. Of the total 111 patients 19 have died, all from urinary infection. At the King George Hospital 339 cases of spinal injury have been admitted, 22 were transferred and 160 have died, practically all from urinary infection.

It is important to inquire how the infection occurs and what is its nature. In all cases the infection takes place at an early period after the injury, usually within the first week. The circumstances surrounding the first few days following the injury render these cases peculiarly liable to the invasion of bacteria. The patient lies exposed for some hours, and in many cases has been inaccessible for two or even more days. During this time the urine collects and the bladder is greatly distended. In this state the patient, still suffering from profound shock, arrives at the casualty clearing station, where a catheter is passed and the bladder is emptied. The rush of urgent and serious cases, the very great difficulties in pursuing a perfectly aseptic technique, the ready soil which an over-distended paralysed bladder presents to the invasion of bacteria, together render infection extremely probable. And should it not take place here there are ample opportunities during transport to a base hospital either in France or in England for the bladder to become infected.

The cystitis which results is of a particularly severe character, and in most cases it is of the haemorrhagic type. Cystitis in itself is not, or only very rarely, a fatal disease, and should the infection remain confined to the bladder no serious harm would result. In a large proportion of cases, however, the infection ascends to the renal pelvis, causing pyelitis, and invades the renal substance, when septic pyelonephritis results.

Septic pyelonephritis is a peculiarly fatal disease, and is the cause of death in the great majority of fatal cases of gunshot wound of the spine that survive the initial shock. The onset of pyelonephritis is marked by a rigor followed by a sudden rise of temperature to 102° F. or higher. There is pain in the loins, more marked on one side, and the kidney is tender and may be enlarged. The abdomen is distended with flatus and is rigid on the side of the inflamed kidney. The second kidney is not tender or enlarged. The urine is slightly diminished in quantity, but is not suppressed. It retains the characters of the urine in alkaline cystitis which were present before the onset of the renal complication. Haematuria, which is sometimes severe and may be continuous, frequently appears with the onset of the fever. Herpes of the lips is often present. The temperature may remain high or may have a swinging type, with repeated rigors. After a week the symptoms may subside or they may persist, the temperature remaining high. The patient becomes more drowsy, vomiting and hiccup appear, muttering delirium supervenes, and the patient passes into coma and dies.

A more common type seen at a base hospital is chronic septic pyelonephritis, with recurring attacks of acute pyelonephritis. The patient has passed, at the commencement of the kidney infection, through a severe attack similar to that described. The temperature settles down to normal and the symptoms have disappeared. At intervals of some weeks or months, but often of only a fortnight, there are attacks of acute pyelonephritis. The temperature rises suddenly to 102° or 103°. It remains up for five or seven days and then returns to normal again, and remains normal or subnormal until the next attack. (Fig. 3.)

After a time the condition becomes one of chronic urinary septicæmia. The patient has a sallow, earthy complexion; the skin is dry and harsh, and seldom sweats. The lips are dry and the tongue becomes glazed, dry, and cracked. There is loss of appetite, a buccal dysphagia results from the dryness of the mouth, and only fluids are taken. The bowels are constipated. Progressive loss of flesh, apathy, and drowsiness become more and more marked. Polyuria amounting to 80 or 100 ounces in 24 hours, may be observed in the intervals between attacks, while the quantity of urine is diminished during an acute attack. The temperature is subnormal.

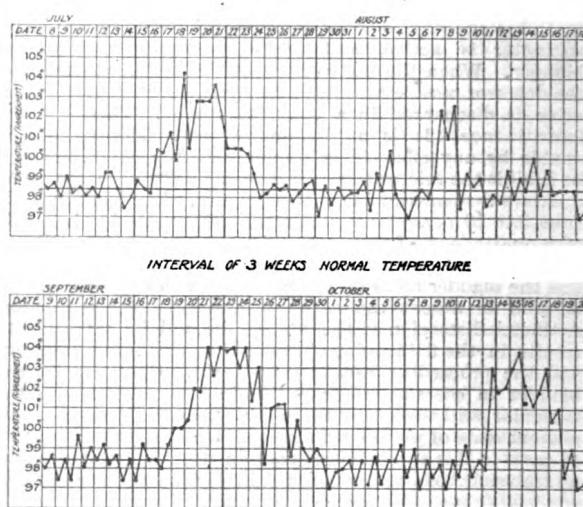
The course of chronic urinary septicæmia is interrupted by acute attacks of varying severity, frequently following some exciting cause, such as exposure to cold or too vigorous bladder washing. Finally the patient dies during an acute attack.

It is frequently a matter of difficulty to distinguish the septic state, due to absorption from a sloughing bedsore, from the symptoms of acute septic pyelonephritis. With a painful, enlarged, tender kidney, protected by rigid abdominal muscles, there is no difficulty in the diagnosis. But the pain may be slight or misplaced. It is not infrequently absent, or only elicited on careful questioning. In some cases of

paraplegia the pain is felt not in the kidney area but in the epigastrum, and the position is misleading. Rigidity of the abdominal wall is a feature of a number of cases of paraplegia, quite apart from any renal infection. This may mask a tender kidney, or it may lead to an erroneous value being placed on the muscular rigidity. The enlargement of the kidney may be slight and difficult to detect. The urine forms no guide. It is an alkaline ammoniacal, occasionally blood-stained urine of alkaline cystitis.

In such difficult cases the points on which I place most reliance are tenderness of the kidney and the character of the temperature. Tenderness is almost always present in some degree, and a comparison of the two sides will help. The chief characteristic of the temperature chart is the occurrence of isolated attacks of high temperature lasting a week or ten days, with intervals of varying length, during which the temperature is normal, or, in advanced cases, subnormal. (Fig. 3.) The raised temperature due to absorption

FIG. 3.



Temperature chart of case of chronic pyelo-nephritis with acute exacerbations.

from a septic bedsore shows an irregular daily rise, continued over some weeks, with gradual improvement and without any definite periods of normal and subnormal temperature, or any well-defined short attacks.

In the late stages when both kidneys are infected the distinctive features are the red, glazed, dry tongue, headache, thirst, inability to take solid food, rapid emaciation, and dry, harsh skin. Vomiting is a late and serious symptom.

In investigating a case of paraplegia with fever it should not be forgotten that, owing to the anaesthesia, a large abscess may form in the neighbourhood of a bedsore or elsewhere and be quite painless, so that the patient does not draw attention to the spot.

#### TREATMENT.

Treatment of the urinary tract in paraplegia resolves itself into two chief lines: (1) Provision for the removal of urine; (2) treatment of septic complications.

#### *The Removal of Urine.*

Cases of paraplegia are divided into two classes in regard to the disposal of the urine. In the early stages there is complete retention and the urine must be removed artificially; in the later stage there is active incontinence, and the only necessity is to collect the urine as it is passed. In the stage of retention, some means of emptying the bladder must be used. Three methods are available. A catheter may be passed at regular intervals, a catheter may be tied in the urethra (catheter à demeure) or the bladder may be drained by operation.

1. *Catheter life.*—The passage of a catheter is the method that has been universally adopted. A catheter is passed at the earliest moment after the injury, and at regular intervals,

usually three times in 24 hours after this until active incontinence is established. Under favourable conditions the first catheterisation may be performed seven hours after the receipt of the injury. The average time that elapsed before a catheter was passed in 46 cases was 27 hours. Two patients lay out for four days, and four for three days before they could be reached. The average period during which the use of the catheter, for the purpose of emptying the bladder, is necessary is two months. In one case the duration of the retention stage was 18 months, in another 15 months, but these cases are exceptional.

2. *The tied-in catheter: catheter "à demeure."*—The tied-in catheter has been resorted to in a number of cases. In some for the purpose of draining an infected bladder, in others in order to avoid the necessity of catheterisation three or more times in 24 hours. The constant presence of the catheter in the urethra very quickly sets up urethritis, with purulent discharge and swelling of the urethral mucous membrane; and after a few days the method has to be abandoned in most cases. This method, useful for a short time in an emergency, is quite unsuitable for the continued treatment of retention in paraplegia. The danger which attends it is the development of a perineal abscess and the formation of a urinary fistula, or the sloughing of a large portion of the urethral wall, with the overlying skin. The tying-in of a metal catheter will bring this about in a few days, and is an extremely dangerous procedure, even in cases where no nerve lesion exists.

3. The third method is drainage of the bladder through a suprapubic wound. I shall discuss this method later.

#### *Treatment of the Septic Complication.*

1. *Local treatment by bladder washing*—It is unnecessary to describe this in any detail, but one or two observations may be made. The best method is to use an irrigator, the reservoir holding 3 or 4 pints, and being raised about 3 feet above the level of the patient. By means of rubber tubing and a glass nozzle which fits the catheter, 3 ounces of fluid are run into the bladder and allowed to run out again into a vessel between the thighs, and this is repeated until the contents of the reservoir are exhausted. As large a catheter as will pass along the urethra should be used. No attempt should be made to distend the bladder beyond the amount of fluid it holds readily. If the pressure is raised too high by over-distending the bladder there is danger of forcing septic material up the ureter and causing an ascending infection or a recurrence of pyelonephritis when this has already been established.

Strong antiseptics should be avoided in washing the bladder. They cause swelling of the mucous membrane and an increase in the cystitis. The action in bladder lavage is as much a mechanical as a chemical one, and the total quantity of fluid used is of as much importance as the character of the antiseptic employed. Before commencing bladder washing the reaction of the urine should be tested, and a wash selected which will counteract extreme acidity or extreme alkalinity, if either state exist. In selecting a bladder-wash, therefore, and also as I shall presently state, in choosing drugs for internal administration, the reaction of the urine should be the first guide.

Another point in regard to the reaction of the urine in bladder washing is that deposits in the bladder wall take place: mucus shreds and flakes in an acid cystitis, and phosphatic material and mucoi in an alkaline cystitis. An attempt should be made at the beginning of each washing to remove these deposits by the use of a wash of different reaction. An acid wash will dissolve phosphatic débris, and an alkaline will facilitate the washing away of thickropy mucus in an acid cystitis. A large number of different bladder washes have been tried, but no one is a specific, and the fluids commonly used are found to be as good as any.

In alkaline cystitis, and this forms the great majority of cases of cystitis in paraplegia, boric acid solution one half the saturation strength may be used. If the urine be powerfully alkaline, and especially if fragments of phosphatic material are being formed and passed, a preliminary wash with a solution of acetic acid (B.P.), one drachm to the pint, should be used, and followed by boric solution, or large quantities of the acetic acid solution may be used for several days at a time. At the same time steps should be taken to render the urine acid by means of drugs given by the mouth.

In an acid cystitis normal saline solution, in full or in half-strength, is frequently very successful. Permanganate of potash solution (1 in 8000), peroxide of hydrogen solution (1 in 20 of 10 volume), and silver nitrate solution (1 in 10,000) are all useful. A note may be made in regard to the newly introduced chlorine preparations. The solutions are intensely irritating to the bladder, and should be used with caution. A solution of 1 in 20,000 is sufficiently strong to use at first, and this may cautiously be increased in strength.

2. *Medicinal treatment.*—In giving medicines the two objects kept in view are the reduction of extreme acidity or extreme alkalinity of the urine, thus reducing the irritation of the bladder and, secondly, the administration of urinary antiseptics.

An acid urine is easily reduced to alkalinity by giving drugs such as bicarbonate of soda, potassium citrate and acetate, and diuretic waters such as those of Contrexéville, Vittel, and Vichy. An alkaline urine is usually difficult to render acid. The two drugs that have a powerful acidifying action on the urine are sodium acid phosphate (introduced for this purpose by Dr. Robert Hutchison), and sodium or ammonium benzoate. Sodium acid phosphate should be given alone and the dose increased every few days till the urine gives an acid reaction. The limit of tolerance is reached by diarrhoea being produced. Four or eight drachms in 24 hours are usual doses. The benzoates should be given in doses of 10 to 20 grains three times daily.

It is impossible here to enter into the details of treatment by urinary antiseptics. This has been discussed fully elsewhere.<sup>8</sup> It is sufficient to repeat that hexamine (urotropine) depends for its antiseptic action on splitting and giving off formaldehyde, and that this takes place only in an acid medium. Boric acid is the best urinary anti-septic when the urine is alkaline. It may be combined with ammonium benzoate, and when the urine has become acid hexamine may be added. When the urine is acid hexamine may be given alone.

In the early stage of an acute cystitis, the first object should be to soothe the intensely inflamed mucous membrane by drugs and diuretic waters, occasionally with the administration of sandal-wood oil.

3. *Vaccine treatment.*—Vaccine treatment has proved of great value in treating the chronic cystitis of these paraplegic cases. Vaccine therapy forms a chapter in itself, and there is not time to do more than to recommend its use.

#### DRAINAGE OF THE BLADDER BY SUPRAPUBIC CYSTOTOMY.

Lastly, I come to the subject of cystotomy, which I have deferred in order that I may link up the question of drainage in the different stages. In the first place, I wish to discuss suprapubic cystotomy as a prophylactic measure.

It should not too readily be accepted that infection of the bladder, with resultant ascending pyelonephritis, is inevitable. The infection is not a haemogenous infection from the bowel or elsewhere; it is an ascending infection introduced by the catheter. I have already referred to the circumstances in which catheterisation of these cases is commenced and to the very great difficulties of a perfect technique under such conditions. But the real danger, the fatal complication, is not the cystitis itself; it is the ascending pyelonephritis (surgical kidney) that results from it.

#### *Cause of the Ascending Infection.*

It is worth while inquiring how this ascending infection comes about. There are natural barriers to the ascent of infection. The lower end of the ureter penetrates the wall of the bladder very obliquely, and its longitudinal layer of muscle passes into the trigone. When the bladder is distended the trigone is pushed down and the bladder wall stretched, so that the intramural portion of the ureter becomes more oblique and flattened, and the intravascular tension further closes the lumen by pressure. When the bladder is contracted the intramural portion becomes shortened and less oblique, but the mucous membrane is thrown into folds which prevent a reflux of fluid. The downward flow of urine is a further protection against the ascent of bacteria. When the bladder is forcibly over-distended by injecting fluid through a catheter these barriers are overcome, and fluid may be forced up the ureter.

In the early retention stage of these paraplegic cases the bladder is greatly over-distended, sometimes for several

days; and there is no doubt that the barriers to a reflux into the ureter must be considerably weakened if not entirely overcome. Further, the effect of the over-distension and consequent great increase in tension have caused damage to the kidney. Guyon and Albaran<sup>9</sup> made experiments in 1897 on the effect of acute retention of urine on the kidneys. They found that an aseptic pyelonephritis resulted. There was acute congestion which might go on to intratubular hemorrhages, with desquamation of epithelium of the tubules. Clinically, there was lessened secretion of urine, while the urine contained a reduced quantity of salts, and there were present blood, renal cells, blood casts, and epithelial casts. Relief of the retention was followed by polyuria and the symptoms subsided if no sepsis were present.

In these paraplegic cases we have the barriers against ascending infection overcome and the kidney damaged, and therefore unusually susceptible to the invasion of bacteria. The smallest slip in technique will surely lead to cystitis and ascending pyelonephritis, and such a slip must be guarded against, not only at the first catheterisation, but during the whole retention stage of many weeks, or even months. Over-zealous washing of an inflamed bladder with too strong antiseptics or too great distension of the bladder will just as readily produce an ascending infection as a septic catheterisation of the original over-distended bladder. The ascent of infection from the bladder to the kidneys is, in my view, due to pressure or intravesical tension. There are other factors that may play some part. The motile bacillus travels upwards, even against stream. The fact that there is a nerve lesion may reduce the resistance to bacterial invasion. Probably the ureteric orifice is more easily forced in such cases. But these are all of secondary importance, and the raised intravesical tension caused by chronic retention is the deciding factor.

#### *Prophylactic Cystotomy.*

Is there a remedy? Certainly there is, and it lies in early and continuous drainage of the bladder. Continuous urethral drainage by catheter is unsuitable, as I have already pointed out. The only method that is efficient is suprapubic cystotomy. Let me make the position quite clear. Suprapubic cystotomy here advocated is not suprapubic cystotomy for the drainage of an already infected bladder. I see a fair number of these cases and will discuss them later. The suprapubic cystotomy suggested is to take the place of the catheter entirely. No catheter is passed at any time. One catheterisation may be sufficient to cause the whole damage—cystitis and ascending pyelonephritis. It is suggested that the bladder be opened suprapublically at the earliest possible moment, before any catheter has been introduced, and be drained continuously until the second stage of active incontinence is reached; as shown by the patient passing urine along the urethra, as well as draining by the suprapubic tube. I have seen no cases in which this has been done, and have not heard of its having been carried out.

Will this prevent cystitis? It may in some cases, but I do not expect it will in all; but I hope that the cystitis when it occurs will be of a milder type. Cystitis in an open bladder is a very different affair from cystitis in a closed, paralysed bladder. There are very few cases of cystitis in an open bladder that cannot be cleared up by the use of continuous irrigation. The important point is that there is no urinary tension inside a drained bladder, and therefore no tendency to ascending infection; and this is the object of the drainage.

If 20 cases were treated thus and followed up carefully the result could easily be ascertained. I do not doubt that the results would be much better than those in 20 consecutive cases treated by catheter or by bladder drainage after the bladder had been infected by the catheter. Are all cases to be placed in the same category? I have already stated that the same initial stage of retention may result from a lesion of any part of the cord or the cauda equina and, later, be followed by active incontinence or voluntary micturition. All cases are thus equally in danger. It is not the extent of the nerve lesion that matters: it is the paralysis and over-distension of the bladder.

Is it practicable? This is a question that cannot be fully answered by a surgeon working at a base hospital. The great majority of cases are catheterised for the first time at a casualty clearing station. What the facilities are at this

station for the performance of a rapid suprapubic cystotomy only those on the spot can say. A more practical point for me to discuss is: What time may be allowed to elapse before draining the bladder in these cases, so that the patient may be conveyed to some place where suprapubic cystotomy can be safely performed without being subjected to undue risk by delay in emptying the bladder?

It is obvious that the sooner the drainage is done the better, but I do not think great harm would result if the bladder could be drained in 24 or even 48 hours after the receipt of the injury so long as no catheter was passed before that. Morphia might, in the absence of other contraindication, be given if necessary. The operation is not a difficult or a long one. The anaesthesia in most cases extends above the suprapubic area, so that no general anaesthetic is necessary. The bladder is fully distended with urine, so that no catheter need be passed.

A vertical incision  $\frac{1}{2}$  inches long is made from the upper border of the symphysis pubis in the middle line, the rectus sheath and pyramidalis muscles cut through, the fibres of the recti separated, and the forefinger seeks the upper margin of the symphysis pubis, detaches the thin transversalis fascia from this, and sweeps the peritoneum upwards. The firm cushion of the bladder wall can then be felt. A scalpel is passed along the finger and plunged through, and the finger slips into the bladder cavity as the urine rushes out.

A self-retaining Pezzer rubber catheter on a stilette is pushed along the finger, guided into the bladder, and the finger removed. A small wick of gauze is placed in the prevesical space, and one, or at most two, silkworm-gut stitches bring the rectus sheath and skin together above the tube. A broad layer of gauze is thoroughly covered with boric acid crystals (not powder) and another layer of gauze over this, so that the crystals are sandwiched in the gauze, and this applied round the catheter, and held in place by two strips of adhesive plaster. The end of the catheter is carried into a bottle between the thighs, or at the side of the loin, an additional piece of rubber tubing being added to the catheter, if necessary. This arrangement will suffice to drain the bladder until a base hospital is reached and some more elaborate system can be devised.

#### *Suprapubic Cystotomy for Cystitis.*

Suprapubic cystotomy has been frequently performed with the object of draining a septic paralysed bladder, or when the urethra is oedematous and bleeding from catheterisation. At the time this is done the urine is infected, and is often alkaline and stinking. Two tubes kept together by a silkworm gut stitch should be introduced into the bladder, and the edge of the bladder wall may be stitched with catgut to the rectus sheath or to the skin. The double tube is used for continuous irrigation, the irrigating fluid passing down one tube and out of the other. For the first four or five days after the cystotomy, and intermittently after that, continuous irrigation should be carried out with weak antiseptic solutions such as silver nitrate (1 in 10,000), permanganate of potash (1 in 5000), peroxide of hydrogen (1 in 40 of 10 vols.), &c. It is carried out in the following manner:

A Hamilton-Irving suprapubic drainage-box is adjusted, and one of the outlet tubes is carried under one thigh and over the edge of the bed into a large receptacle. The other outlet tube may be clipped. A reservoir is hung two or three feet above the level of the patient, and from this a rubber tube passes, being interrupted just below the reservoir by a dropping-glass. The rubber tube passes through an opening in the lid of the Hamilton-Irving box and into one tube in the suprapubic wound. The other suprapubic tube acts as an outflow tube.

Continuous irrigation may be carried out day and night for four or five days, or it may be interrupted for a few hours at a time. This treatment very quickly clears up cystitis if no source of recurrent infection, such as pyelonephritis, is present. Unfortunately, in the great majority of cases in which suprapubic drainage is performed ascending infection has already taken place, and the bladder is constantly reinfected from this source. A very important question arises, however, in regard to suprapubic drainage at this stage. Is it possible, by draining the bladder, to influence the progress of pyelonephritis already established? In the advanced stage, when the symptoms of urinary septicæmia are well marked, I do not believe that any benefit will follow the operation. The progressive emaciation will continue, the anorexia and vomiting increase, and the patient die in spite of free bladder drainage. In the earlier stages, however, when the patient has passed the initial

attack, when the cystitis is well marked and he gets recurrent attacks of pyelonephritis, drainage of the bladder, by obviating the necessity of bladder washing and by abolishing intravesical tension, should prevent the recurrence of the ascending infection.

In some cases the Hamilton-Irving apparatus cannot be used, on account of the extreme flexion of the legs, and the spasmodic contraction of the abdominal and thigh muscles, set up by pressure on the abdomen.

During the first week or so, there is leakage alongside the tube in the suprapubic wound. The use of a suction apparatus such as that of Cathcart is of great value in keeping the patient dry in these cases. After this the wound contracts down on the tube, and a rubber plaque with a rubber cannula to carry the tube is strapped on over a small square of boric lint. This is retained in position by a rubber or canvas waist-band. In many cases it is sufficient to keep a No. 12 rubber catheter in the suprapubic wound and connect it by rubber tubing passing over the abdomen into a bottle lying at the side, in the hollow of the loin. A piece of adhesive plaster will keep the tube from slipping, and no leakage occurs alongside.

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## A METHOD OF CONCENTRATING ENTAMOEBA CYSTS IN STOOLS.\*

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### Introductory.

THE following investigations have been carried out on behalf of the Medical Research Committee and with the assistance of the Durning-Lawrence Fund, under the directorship of Lieutenant-Colonel Sir Ronald Ross.

One of the principal objects of our experiments has been the cultivation of the causative organism of amoebic dysentery, and, as is well known, the difficulties in the way of the accomplishment of this have hitherto proved insuperable, almost all observers now being agreed that the amoebae which have been successfully grown are distinct from both *E. coli* and *E. histolytica*; in fact, the genus created by Chatton and Lalung-Bonnaire,<sup>1</sup> *Vahlkampfia*, has been frequently used, especially for the culturable intestinal forms, to emphasise their distinction from these two species. In a recent communication Penfold, Woodcock, and Drew<sup>2</sup> have described a method by which they have succeeded in causing the excystation of *Entamoeba histolytica*, but they also state that they have been unable to keep the excysted amoebae alive for more than a comparatively short time, 42 to 44 hours as a maximum. This failure to obtain a successful culture they ascribe to the rapid growth of bacteria in their preparations, derived from the faecal matter not got rid of in the washings to which the cysts were subjected. The injurious influence of the products of putrefactive bacteria has, indeed, been already shown experimentally<sup>3</sup> with cultures of amoebae of the *limax* type. We have therefore since then devoted a considerable amount of time to the attempt to devise a method of completely separating the cysts from the faecal matter contained in the stools.

\* Read before the Section of Pathology of the Royal Society of Medicine, Nov. 14th, 1916.

<sup>1</sup> Amibe limax (Vahlkampfia, n. gen.) dans l'intestin humain. Son importance pour l'interprétation des amibes de culture. Bull. Soc. Path. Exot., Paris. Vol. v., 1912.

<sup>2</sup> The Excystation of Entamoeba Histolytica (Tetragena) as an Indication of the Vitality of the Cysts, Brit. Med. Jour., May 20th, 1916.

<sup>3</sup> Cropper, J. W., and Drew, A. H.: Researches into Induced Cell-reproduction in Amoebae, McFadden Researches, vol. iv., April, 1914, John Murray, London.

Such a separation as we have just mentioned has not, so far as we are aware, been accomplished by anyone in the case of amoebic cysts, but a modification of Bass's method of concentration described by Cochran<sup>4</sup> has very nearly achieved it for helminth ova. This method consists in the preliminary emulsification of the faeces in water, and then centrifugation, after which the supernatant water is poured off, and the centrifuge tubes filled up with a 42·5 per cent. solution of calcium chloride in water, well shaken and re-centrifuged, when the eggs rise to the top of the tubes, away from the faeces and almost free from contamination.

On trying this method with *Entamoeba coli* cysts, we found that the cysts are far too fragile to withstand the osmotic currents set up by the concentrated solution, and incontinently crumple up; and a number of other chemical substances, such as syrup, glycerine, and albumin, which we have tried, have given precisely the same results, so that we feel that there is probably no specific gravity method of differentiation between cysts and faeces which will avail for entamoebæ, nor has any other method that we have yet found enabled us to achieve the complete separation of cysts and débris. We have, however, obtained a very considerable measure of success by the methods detailed below, and we are now able to obtain the cysts practically free from bacteria, and from the major part of the faeces.

The principal part of the experiments which we have carried out in investigating this method has been done with faeces infected with *E. coli* cysts, of which a constant supply has been available to us, but a sufficient series of determinations has been made with *histolytica*-infected material and with *Lamblia* infections, to show that it is equally applicable to these species, and we see no reason to suppose that any protozoal cysts would not be equally easily concentrated by it.

The technique of the method used to obtain a maximum concentration of the cysts is given first; subsequently we describe a method by which we have obtained a relative concentration without the use of any chemicals (which might possibly injure the cysts for cultivation purposes); and, finally, we describe a counting method which was devised to confirm the results of our concentration experiments.

### I.—The Maximum Concentration of the Cysts for Diagnosis.

A lump of faeces, which should be at least 1 grammme in weight, is shaken up with about 30 c.c. of normal saline (0·8 per cent. solution of NaCl) per grammme of faeces for a sufficient time to disintegrate the mass into individual particles, and thereby form an emulsion which will only settle very slowly. This is best done on a mechanical shaker in a large flask or bottle of a capacity of at least four times the amount of fluid to be shaken, and we have found it necessary, in order to obtain the best results, to continue the shaking for a minimum of half an hour.

The emulsion is then poured into a separating funnel and shaken up, by hand, for half a minute with 10 to 20 per cent. of its volume of ether (ordinary methylated ether is perfectly suitable for this), after which the mixture is allowed to stand for a minute or two in the funnel until the two liquids have separated. The faecal débris absorbs ether and consequently becomes lighter than water, and, when separation is complete, lies in a mass at the top of the saline, immediately below the excess of ether. The cysts are not affected by the ether, and consequently remain in the saline beneath.

The saline fluid is then drawn off from the separating funnel, and is centrifuged at a slow speed for two or three minutes, the precise time required necessarily depending upon the rate of centrifugation and the size of the tubes. By this means the cysts will be brought down to the bottom of the tubes with the comparatively slight amount of faecal matter not taken up by the ether.

For ordinary diagnostic purposes the concentration now effected, which should be some 15 times as rich in cysts as the original material, will be found adequate, but, if desired, a still greater proportion of cysts can be obtained by decanting the supernatant liquid and filling up the centrifuge tubes with normal saline, shaking thoroughly, and submitting the tubes to fractional centrifugation, the material brought down in the first 10 seconds being discarded,

<sup>4</sup> The Concentration of Helminth Ova from Faeces, China Medical Journal, vol. xxix., 1915.

and the whole time of centrifuging curtailed by half. By repeating this process two or three times the maximum concentration is obtained, and the débris still remaining consists almost entirely of particles of practically the same size as the cysts themselves.

The above is a concise account of the method and its results. We append a series of notes on the various processes.

It is desirable, where possible, to take a fairly large mass of faeces for concentrating, since there appears to be considerable variation in the number of cysts present in different parts of the same stool, and one of the special advantages of a concentration method is to minimise the risk of missing cysts not equally distributed.

The period given for mechanical shaking may seem extraordinarily long, but our experience is that unless the various particles of faecal matter are thoroughly washed off from the cysts the latter are removed with their adhering particles by the ether, and consequently do not appear in the final deposit. In fact, test experiments differing only in the length of time the faeces were shaken with saline showed at least twice as great a proportion of cysts in the final deposit after 30 minutes' shaking as after 15 minutes; and while in the latter case examination of the material removed by the ether showed a considerable proportion of cysts, they were almost entirely absent from it in the material shaken for 30 minutes. This length of time may, however, need to be modified in accordance with the character of the stool to be examined; our own investigations have been principally made on formed or sub-formed stools.

We have employed tap water, distilled water, and normal saline for emulsifying the faeces, and we think that saline is preferable. Whatever the method used, we have very frequently found that a considerable number of cysts have shown what we regard as osmotic collapse, their protoplasmic contents being withdrawn from the cyst wall and collected into a spherical mass about half the diameter of the cyst; but we are unable at present to determine the precise causes which have produced this result, as both the occurrence of the phenomenon is irregular and the proportion of cysts affected has varied very considerably under the same conditions. We find, however, that there tends to be a smaller proportion of cysts showing this effect in emulsions for which normal saline has been used than in tap water or distilled water emulsions from the same faeces and prepared concurrently under identical conditions. The ether employed subsequent to emulsification may be to some extent responsible, but we have more than once observed collapsed cysts in material which has not been treated with ether. In our experience this collapse does not interfere with the identification of the cysts, and we have never seen it save in *E. coli*.

We find that the proportion of the material removed by the ether varies considerably with the character of the stool used, but with an ordinary formed stool at least 90 per cent. of the weight of faeces employed is extracted. To give a concrete example, 10 grammes of faeces were emulsified, treated with ether, and centrifuged in tubes of known weight, and the deposit, after pipetting off the supernatant fluid, weighed 0.595 grammes.

Should the faeces contain fruit pips or other large heavy particles not removed by the ether it is advantageous to transfer the fluid, after treatment with ether but before centrifuging, to a tall test-tube or similar vessel and to permit the heavy particles to settle for a minute before decanting into the centrifuge tubes. The cysts themselves settle very slowly, and it has been found that the proportion which fall to the bottom with the large particles in one minute is negligible.

The time which we have found most suitable for centrifuging with 15 c.c. tubes is either 1½ minutes at 1200 revolutions per minute or 2½ minutes at 600 revolutions per minute. This will bring down practically all the entamoeba cysts from the fluid, but only a small proportion of the bacteria present come down in this length of time. In the case of lamblia a more thorough centrifuging is needed to bring down all the cysts.

The special advantages which this method possesses for diagnosis are obvious. The cysts are much more easily noticed and far more easily identified in the concentrated material than in preparations from untreated faeces. The saving of time spent in the examination of scanty or doubtful infections is considerable, and the concentrate from a comparatively large mass of stool can be examined

in a short time: there is, further, the added advantage that the possible errors attendant upon the examination of a single loopful of faeces are almost wholly eliminated. This is especially useful in the case of suspected infections in which the ordinary preliminary examination has given a negative result, and we think the method will also prove to be of great value for the final examination of carrier and of apparently cured cases before discharge.

An illustration is given (Fig. 1) of the appearance under the low power of a field from a concentration prepared in this manner. A count of the original faeces, from a smear made in the ordinary way without concentration, gave 43 cysts in 117 fields under the same lens; after concentration there was hardly a field to be found in which there were not a dozen cysts, and the average number per field was between 16 and 17.

## II.—The Relative Concentration of Cysts for Cultivation.

We feel that there are distinct disadvantages in the use of ether for treating material to be employed for cultural purposes, as the prolonged contact of the cysts with ether and with ether-saturated water may easily have some deleterious effect, and we have consequently devised a method of concentration which does not require chemicals. The first attempt to effect this was made by filtering an emulsion of faeces in water or normal saline through very fine silk cloth, some varieties of which show microscopically a mesh which is but little larger than an entamoeba cyst. It was hoped in this way to remove all particles larger than the cysts, but in practice the meshes became clogged so rapidly with débris that no filtrate was obtainable, even with the aid of a pressure pump. The smallest mesh which can be employed satisfactorily for the filtration of faecal emulsions is about 40 $\mu$  in diameter, and the method by itself is of little value for concentration purposes. Combined, however, with subsequent centrifugalisation it forms a ready means of obtaining a large proportion of the cysts free from all particles save those which approximate in size to that of the cysts, the larger fragments being held back in the deposit of the silk and the minuter débris remaining suspended in the tubes after centrifuging.

It was found, however, that no modification of this method would give so large a proportion of cysts to débris as the ether method described above, and estimations of the number of cysts per gramme of stool, as determined from the deposit in the tubes by our method of counting, showed that they were considerably less than the actual number present in the untreated faeces, a considerable number having been lost during the treatment, so that the concentration was only a "relative" one—i.e., with respect to the nature of the accompanying débris.

As finally adopted, our method follows in most respects that used by Penfold, Woodcock, and Drew, but as it differs in certain points of importance we think it desirable to give it in full, especially in order to emphasise the necessity of these or similar measures when undertaking any routine work in an endeavour to cultivate entamoebae.

Ten grammes of faeces are shaken with 100 c.c. of normal saline in a bottle or flask on a mechanical shaker for 5 minutes to obtain a uniform emulsion. This is poured on to a layer of fine silk whose mesh is of the size mentioned above, and which is stretched on a tambour (such as is used by milliners), and the emulsion is gently and continuously stirred with a glass rod to prevent the clogging of the meshes of the silk. The residue left on the filter consists chiefly of large lumps and stringy matter, and is discarded. It contains only a small percentage of cysts, which can be still further reduced, if required, by washing. The filtrate (or a portion of it) is then centrifuged for one minute at a speed of 1200 revolutions per minute, the supernatant liquid poured off, and the volume made up again with normal saline. The tube is then well shaken, and again centrifuged as before. This process is repeated until the supernatant liquid is almost clear. Finally the deposit is shaken with 10 c.c. of normal saline and is allowed to stand for a few minutes. The upper portion is then poured off and is thoroughly centrifuged, and loopfuls of the deposit are used to make hanging-drop preparations for culture experiments. An illustration (Fig. 2) is given of a high-power view of the appearance of cysts and débris in such a preparation.

By this means cysts are obtained which have been thoroughly washed free from toxic bacterial products, acid substances, and other deleterious matter present in the original faeces. The cysts can be found easily with low

powers of the microscope, and are not subsequently lost, even though it is necessary to keep the preparations for several days in the incubator. *Amoeba limax* cysts submitted to this process have been subsequently cultivated without difficulty, and were evidently unaffected either by the shaking or the centrifugation.

It must be noted that the length of time, and the speed, of centrifuging considerably affect the percentage of cysts in the final deposit; and we have selected one minute at 1200 revolutions per minute as giving the best practical results. Apparently about two minutes is required to carry down all the cysts, but a much greater proportion of the finer particles of faecal matter and bacteria accompanies them than when centrifugation is confined to the shorter time. An additional method of removing any large particles that may still be present is afforded by centrifuging for 15 seconds at 600 revolutions per minute, decanting the fluid into other centrifuge tubes and re-centrifuging for one minute at 1200 revolutions per minute; the larger particles are brought down during the preliminary 15 seconds with but a very small proportion of the cysts, and this process, repeated four times, results in the larger débris containing only one-tenth of the proportion of cysts present in the original faeces.

We have not been able to separate the cysts from débris to any further extent except by picking off a single cyst in a capillary tube, which is a comparatively simple matter in the case of *E. coli*, and has been done repeatedly in our experiments.

### III.—Method for Counting Entamoeba Cysts in Stools.

In THE LANCET of June 10 h, 1916 Miss Annie Porter<sup>6</sup> described a method of counting lamblia cysts in stools by means of a Thoma-Zeiss haemacytometer. Finding the volume of the chamber too small for counting entamoeba cysts, owing to their comparative scarcity—viz., about 1 cyst per 400 squares in an ordinary degree of infection—we devised the following method, which is described in the stages in which it is carried out.

A uniform emulsion of 10 grammes of stool (selected from several different portions of the bulk) is made in 100 c.c. of normal saline (i.e., 10 per cent. weight + volume) by shaking on a mechanical shaker for 10 minutes. All soft masses are broken up in this way, and the sediment which falls consists only of gritty particles, the so-called "false sand," which microscopic examination shows to contain no cysts.

A capillary pipette is made and is calibrated to deliver 20 c.mm. in a length of about 2 inches. It is provided with

being retained in a pipette made according to the above instructions when the mixture is blown out: in fact, we have not yet found a single cyst in the washings out after use.

Several glass slides, 3 inches by 1½ inches, having been prepared with a ring of vaseline 1 inch in diameter, a measured volume (20 c.mm.) of the emulsion of faeces is drawn into the pipette and is placed in the centre of the ring.

A cover-slip ruled in squares, such as is used with Böttcher's slides, is then allowed to fall gently, with the engraved face lowermost, flat on to the drop of emulsion, and, if necessary, is pressed down to diminish the depth of the layer of liquid. The count is made with a low power. The cysts which happen to be in any portion of the drop which extends beyond the squares are easily counted, and are indicated in the count by the letters A, B, C, &c. The squares themselves are numbered as shown (the reverse way up) in the diagram (Fig. 3).

We have made sufficient experiments to establish the utility of the method for counting entamoeba cysts in faeces, and we see no reason why its employment should not be extended, with such modifications as are found necessary, to the counting of other protozoa, either in their natural surroundings or under different conditions of cultural environment.

It has been pointed out to us by Sir Ronald Ross that in counting methods there are considerable statistical errors, the magnitude of which depends, roughly in an inverse ratio, on the actual number of things counted. Thus it is necessary to count a fairly large number of cysts in order to reduce the error to a reasonable percentage, and the present method has been devised to render this possible. The statistical tables compiled by Ross and Stott<sup>6</sup> show, for example, that if only 68 cysts are counted the probability is 9 to 1 that the error does not exceed 20 per cent., and that, if the error is required to be within 10 per cent., 271 cysts must be counted. It is advisable, therefore, to use an emulsion for counting purposes as thick as possible, consistent with ability to recognise the cysts without difficulty.

For counting *E. coli* cysts we find a 1 in 10 emulsion the most suitable, and in an average infection we count 100 cysts. With *Entamoeba coli*, as in Miss Porter's cases of *Lamblia* infection, there are considerable daily variations in the number of cysts present in the stools, ranging in a case we have been studying from 1500 to 60,000 per gramme.

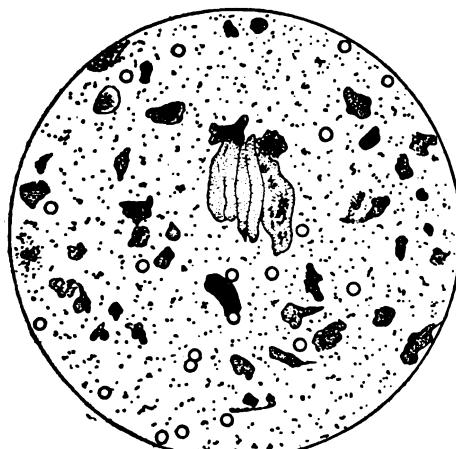
#### Summary.

1. Methods of concentrating entamoeba cysts from faeces are described, suitable for diagnosis and

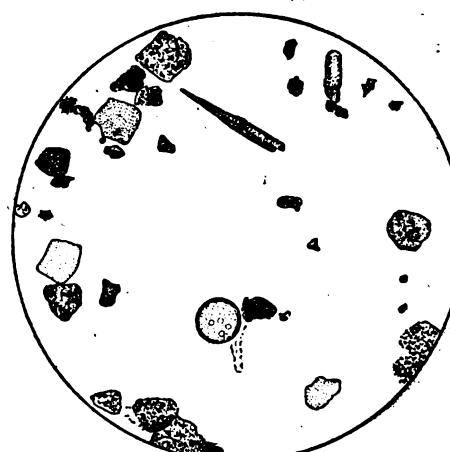
cultivation experiments respectively.

2. A very high concentration, suitable for diagnosis, has been obtained by emulsifying faeces and treating the emulsion with 10 to 20 per cent. of ether. This removes the greater proportion of the faecal matter, while the cysts remain in the saline used for emulsification, and are collected by subsequent

FIG. 1.



Maximum concentration of *E. coli* cysts in stools by the ether method. One field. Low power:  $\times 50$ .



All visible particles and a 4-nucleate cyst of *E. coli* in one field of an emulsion prepared by the method of relative concentration for cultivation experiments. High power:  $\times 275$ .

a rubber teat. It is well to have several of these pipettes ready to hand, so that successive counts can be made with a dry one without any unnecessary delay. The pipette supplied with Gowers's haemacytometer, and other similar ones—which are on the market, can be used for the purpose, but they have a somewhat narrow bore and frequently become clogged with débris. There is little risk of any cysts

<sup>6</sup> An Ethnographic Study of the Cysts of *Glycera* (*Lamblia*) intestinalis in Human Dysenteric Faeces.

<sup>6</sup> Tables of Statistical Error, Annals of Tropical Medicine and Parasitology, vol. v., No. 3, December, 1911.

FIG. 3.

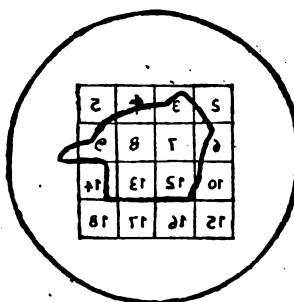


Diagram to show the method of counting entamoeba cysts in stools. The edges of the large drop of 20 c.mm. of faecal emulsion are indicated by the thick irregular line, and all cysts in this drop are counted with a low power.  $\times 13$ .

centrifugalisation with but little accompanying débris. 3. A second concentration method is described which does not necessitate the use of ether, and which is therefore more suitable for preparing cysts for cultivation experiments. This consists of filtering the emulsion through silk, and subsequent fractional centrifugalisation. 4. The difficulties in the way of enumerating entameba cysts are discussed, and the method found most suitable, by means of the cover-slips used with Böttcher's slides, is described.

### A CASE OF SUPPURATIVE MENINGITIS WITH GLYCOSURIA SIMULATING DIABETIC COMA.

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ON Oct. 13th, 1916, the following case was admitted into the Queen Alexandra Military Hospital, and was thought worthy of being placed on record on account of several interesting points to be discussed later.

Second Air Mechanic A—, of the R.F.C., aged 36, with four months' service, had been ill for 24 hours, complaining of severe pain in the right side of the chest, cough, and difficulty of breathing. On admission the patient appeared ill, with flushed face and marked dyspnoea. The temperature was 102° F., the pulse-rate was 112, and the respirations were 38 per minute. Examination of the chest revealed diminished expansion of the right lower chest, with stony dullness and absence of tactile vocal fremitus and breath sounds of the right lower lobe. Typical "rusty" sputum was being expectorated, and the case was diagnosed as one of pleurisy and pneumonia. Poultices were applied to the chest. Calomel gr. iii. and pulv. ipecac. co. gr. x. were ordered *statim*.

Oct. 15th: The patient had had a bad night. Pain was intense, so that he could not lie comfortably in bed. The temperature still ranged from 101° to 103°. The pulse was of good quality, with a rate of 100. The respirations were very rapid, rising to 60 per minute. The physical signs in the chest remained the same, no signs of fluid being present. There was no cyanosis. The heart and pericardium were normal. The application of leeches to the right side of the chest caused great relief of the pain almost immediately, and a stimulant expectorant mixture was prescribed. Oct. 16th: Patient appeared to be greatly improved, said he felt quite well, and was very cheerful. The temperature was 102°, pulse 100, and respirations 36. There was very little cough and no expectoration.

Oct. 17th: The ward sister noticed some twitching of the patient's face; he had previously complained of intense headache. He vomited immediately afterwards and became very collapsed with incontinence of faeces. Coma rapidly supervened, with dilated pupils which did not react to light. Conjugate deviation of the eyes was noted first to the left and then to the right. All the superficial reflexes except the conjunctival were lost. Later he became very restless, constantly picking at his face, which wore a perpetual frown. The respirations rose to 64 and presented the appearance of air-hunger. The pulse still remained of good quality, being 100 to the minute. He had retention of urine, and a catheter was passed, drawing off 20 oz. On examination this contained a trace of albumin and a few hyaline and granular casts, as well as a large amount of sugar (not estimated quantitatively), but acetone and diacetic acid could not be detected. No distinctive odour of his breath could be recognised by any of several observers who examined him with this in view. Further, no history suggestive of glycosuria—excessive thirst, wasting, or polyuria—could be elicited on cross-examination of his wife; his health before this attack seemed to have been very good. An attempt made to administer alkalies subcutaneously was unsuccessful on account of the patient's restlessness, and rectal salines met with no better results. He could not take anything by the mouth. His condition remained much the same during the night.

Oct. 18th: The respirations were now 80 and the pulse 144, and inclined to be irregular. His colour had much improved. The pupils were no longer dilated. He appeared to be temporarily paralysed on the left side, and had conjugate deviation of the eyes to the left. Incontinence of urine now

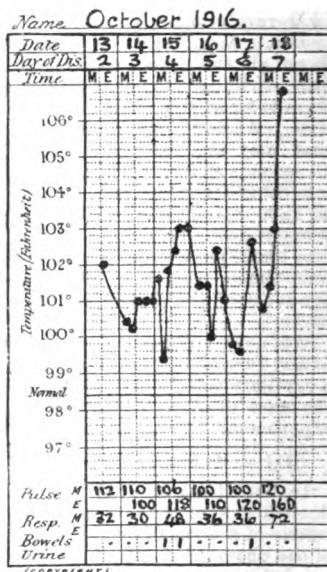
developed, but a sample of urine was collected and found to be quite free from sugar, whilst the quantity of urea present was normal. Venesection was performed, 20 oz. of blood being removed, and two pints of normal saline containing 1 per cent. soda bicarb. were injected into the vein. Later the eyes became deviated to the right, the pulse got weaker, Cheyne-Stokes respiration developed, the colour became cyanosed, spasms of the jaw and muscles of both arms were noted, and the patient died at 3 P.M. Just before death the temperature rose to 107°. The temperature chart is here shown.

A post-mortem examination was made 36 hours after death. The body was well nourished and showed no signs of external injury except a haematoma about the size of the palm of the hand between the umbilicus and left anterior superior spine of the ilium. Thorax: The whole of the pleura covering the right lung was covered with a layer of semi-membranous purulent exudation about a quarter of an inch thick, which could easily be peeled off. The left lung and pleura appeared healthy. There was no free fluid in the pleural cavity. The heart appeared normal and there was no pericardial effusion. The vessels about the base of the heart and the structures in the mediastinum were normal. Abdomen: All the organs, including the kidneys and liver and pancreas, appeared healthy. Brain: On removing the outer coverings of the brain pus was found mapping out the sulci on the anterior, superior, posterior, lateral, and internal surfaces, and also following the course of the blood-vessels. When the brain was removed the base was found free from pus except for a small area on each side where the middle meningeal artery takes its origin. The upper surface of the cerebellum was thickly covered with pus, particularly in the region adjoining the mid-cerebrum. The other surfaces of the cerebellum were free from pus. No pus could be found about the medulla. The brain when cut into showed no sign of abscess or excess of fluid in the ventricles.

Smears taken direct from the pus in the sulci, stained by Gram's method, showed long chains of streptococci as well as staphylococci. Streptococci were also found in smears from the cerebro-spinal fluid and in the blood drawn direct from the seared heart. Media of agar, broth, and trypsin legumin agar inoculated from the blood and the pus from the brain and pleura, incubated at 37° C. for 24 hours and examined, showed growths of streptococci, *Staphylococcus aureus*, and a large Gram-positive sporing organism, the last being, no doubt, due to post-mortem invasion of the tissues.

Although the nature of this case was plainly revealed by the post-mortem examination, the recognition of the cause of the sudden coma formed a difficult and perplexing problem during life. It was in the attempt to settle this question that the urine was sent for examination, and when it was found that it contained a large quantity of sugar the diagnosis of diabetic coma was raised. The absence of polyuria and of acetone and diacetic acid in the urine, as well as the absence of the characteristic sweetish acetone-like odour of the breath, rendered this diagnosis a very questionable one.

The question of uræmic coma was next raised, seeing that albumin, though in small amount, as well as a few hyaline and granular casts were found in the urine. The determination of the percentage of urea was then suggested, and for this purpose a further specimen of urine was obtained on the following day. The percentage of urea was found to be normal (i.e., 2 per cent.), and this fact was taken as disposing of the diagnosis of uræmic coma. A quantitative determination of the sugar was then decided upon, but in this specimen no trace of sugar or other Fehling reducing substance could be obtained, showing that the glycosuria was



Temperature chart showing rise of temperature to 107° before death.

only a transient condition. Lastly, the terminal hyperpyrexia, the temperature rising just before death to 107° F., which occurs not uncommonly in infective conditions, is an interesting point to note.

As regards the relationship between diabetic coma and the presence of the acetone-bodies in the urine, Cammidge<sup>1</sup> states that "all cases of diabetes are not complicated by acetonaemia, although it is a constantly present menace, since a deficiency in the oxidative process of the body is an essential element of the condition. It is only when this reaches a certain stage that the acetone bodies appear in the urine as a necessary consequence." Further, he states the acetone and aceto-acetic acid, though usually present in the urine when the coma supervenes, are not so abundant as before, but that the amount of beta-oxybutyric acid is generally much increased.

The completed history of the case, with its transient glycosuria, indicates the neurogenous origin of the glycosuria. Regarding this condition, Cammidge<sup>2</sup> states that "such a transitory glycosuria, apparently of central origin, has been noticed in connexion with lesions of both the central and peripheral nervous system, such as tumours and haemorrhages at the base of the brain, lesions of the floor of the fourth ventricle, cerebral and spinal meningitis, concussion of the brain, fracture of the cervical vertebrae, tetanus, and sciatica. It has also been met with after epileptic, hystero-epileptic, and apoplectic seizures, in traumatic neuroses, such as those following railway accidents, mental shocks, mental strain, worry, fatigue, and great anxiety."

The practical lesson which this case enforces is the danger of concluding that the presence of sugar in the urine of a comatose individual is necessarily due to diabetes. Further investigations and a critical survey of the history of such a case are essential for the accurate elucidation of the cause of the condition.

We have to thank Captain H. S. Morton, R.A.M.C., for the clinical history of this case, and Surgeon-General J. Dallas Edge, C.B., A.M.S., commanding the Queen Alexandra Military Hospital, for permission to publish it.

## THE RECURRENT TYPE OF "TRENCH" FEVER IN MESOPOTAMIA.

BY C. F. COOMBS, M.D. LOND., M.R.C.P. LOND.,  
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FORCE "D."

THE following case came under my observation recently at Amara, in Mesopotamia.

The patient, an officer aged about 36, was employed at the advanced base and had never been to the fighting line; he had been pulled down a little by one or two attacks of diarrhoea. Towards the end of April he had an attack of fever lasting two or three days, unaccompanied by rigor, and almost certainly not malarial. It seemed to belong to the category of short fevers, of which there were many examples in Amara. These attacks were generally traceable to exposure to the sun, which was beginning to get hot at that time. In this case the fever passed off, leaving the patient perhaps a little more vulnerable to the sun than before, but without definite sequelæ. Soon after a small degree of foot-drop developed in the right foot, with some anaesthesia of the dorsum of the foot, but this did not seem to have any direct connexion with the febrile attack which had preceded it.

About the middle of May, after a day of premonitory malaise and depression, the temperature ran up one afternoon to 103° F. and over. There was some mental excitement, the back and head ached, and the fall of temperature which soon followed was accompanied by a drenching sweat. After a couple of days in bed the patient returned to duty, but felt very tired and slack. Just a week after this last febrile attack another one developed. The fever was not so high, but it lasted two or three days. The pains accompanying it in back and limbs were more pronounced. Four similar attacks followed at intervals of exactly six days. Each attack exhibited a little less fever and a little more prostration than those which preceded it. In the later ones the pains were more pronounced, especially in the shins and tarsal bones. These pains were much aggravated by walking, and at night they were sometimes severe enough to

prevent sleep. Latterly they tended to persist after the febrile bout was over. Possibly there was a fifth attack, but if so the rise of temperature was slight. As it occurred, if at all, during transfer from one hospital to another, this slight rise may have been overlooked.

In all, therefore, there were six pyrexial bouts. None of them were marked by definite rigor. There was always a day of premonitory discomfort. During the two earlier aphyrexial intervals the patient felt comparatively fit, but each returning attack, though in itself less severe, induced a progressive loss of strength and flesh, the latter amounting in all to nearly one quarter of the total body weight. He became very pale and a little short of breath on exertion. The pulse was persistently quickened. The bowels were constipated and the urine normal. The foot-drop already alluded to cleared up slowly with the rest in bed.

The blood was examined several times. No spirilla or other protozoa could be found. Cultures were negative and agglutination results equivocal. There was a mild polymuclear leucocytosis between the fifth and sixth attacks.

Many suggestions were offered as to the diagnosis. My own view was that it might be one of the spirillar group of relapsing fevers, but this was negatived by the blood examinations, made by no less an authority than Major F. P. Mackie, I.M.S., whose researches into these diseases are well known. Captain Jamieson, R.A.M.C., recognised the similarity of the symptoms to those which had been described in Flanders under the heading of "trench fever." I was not at that time familiar with this syndrome, but since returning to England and being transferred to France I have seen a number of cases of a recurrent fever which closely resembles the pyrexial illness described above.

Two other cases of a similar fever came under my notice in Mesopotamia, but I have no satisfactory notes of them. In none of the three cases was any treatment effective save evacuation from the country into a cooler climate. This corresponds with general experience of the disease: nothing does much good except rest, plenty of food, and all the other ordinary means of increasing resistance to infection.

The causation is obscure. That the climatic factor may be ruled out is proved by the occurrence of the disease in Mesopotamia, in the Balkans, in the British armies in Flanders and in the French armies in the field, and in the troops on the Volhynian front. So far as the biting insect factor is concerned, Mesopotamia is certainly one with the other war areas; except that there are added various other torments of this description to those which usually adorn the person of the soldier in the field. The whole problem is well worthy of investigation, as the disease may inflict prolonged invalidism on the soldier. Fortunately there do not appear to be any permanent sequelæ.

## A PRELIMINARY CONTRIBUTION ON "P.U.O. (TRENCH FEVER)."

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AND

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CAPTAIN, R.A.M.C. (T.O.); PATHOLOGIST, NO.—GENERAL HOSPITAL.

ALMOST the only real contribution to our knowledge of this disease, somewhat unfortunately termed "trench fever," which has been published, is contained in the report of the very careful and valuable work carried out under the guidance of Colonel Sir Wilmot Herrington, R.A.M.C., by Captain J. W. Mcnee, Captain R. J. Arundel, Captain Renshaw, and Captain E. H. Brunt. Stated briefly, they have told us that this disease is almost certainly due to an organism which is probably contained in the red corpuscles of the infected persons and that the corpuscular elements of the blood alone are capable of containing and transmitting the disease. This valuable discovery is quite in accordance with what one would expect, judging by the clinical characters so markedly shown in typical cases, and which, in certain respects, are not unlike attacks of malaria. In the main, one would outline these as follows: Sudden onset occasionally with chill. Onset with indefinite but well-marked weakness and malaise, frequently indescribable so far as the patient is concerned, who, when pressed to an extremity in so many instances says, "Well, my legs would not hold me."

<sup>1</sup> Cammidge, P. J.: Glycosuria and Allied Conditions, p. 214. London: Edward Arnold, 1913.

<sup>2</sup> Loc. cit., p. 169.

Pyrexia, severe or slight, irregular, tending to intermit, and with a well-marked suggestion of periodicity of from two or three to five days. Pains, characteristically lumbar, head or legs, all or any, at onset, "shins" later and with extraordinary consistency; vomiting may occur. In character the pains are best exemplified in these so-called "shin pains" and are of a severe boring character and neuralgic in type, being very frequently associated with marked tenderness of the nerves of the calf, including the external popliteal where it passes round the neck of the fibula, where it is frequently exquisitely tender to pressure. The pains are not necessarily confined to the shins, but may extend above the knees as far as the thighs, *missing the joints*.

Certain negative signs and symptoms of great value, when differentiating from the minor maladies, are freedom from catarrhal conditions of the upper and lower respiratory tracts, absence of dryness or furring of the tongue, even with a temperature of 102° or 103° F. The pulse is remarkably stable, and the general feeling of the patients whilst in bed is summed up best in the words they frequently used, "If it were not for this headache I should be alright," or, "If it were not for these pains in my back I should be alright"—a mental attitude which is, in the opinion of the authors unheard of in the typhoid and paratyphoid infections. The spleen is certainly not usually appreciably enlarged either to palpation or percussion. Bowel symptoms we believe not to be characteristic of the condition, though frequently amongst troops, as one would expect, one sees it associated with slight attacks of diarrhoea.

On the course of the disease we cannot speak with confidence, but it would appear that in the majority of cases at least three exacerbations of fever take place extending over an interval of *not less than two weeks*. The pains are, unquestionably, frequently severe and persistent, though not disabling. The blood shows an absence of any ascertainable growth on ordinary media. A count shows moderate leucocytosis only, with some increase of the large lymphocytes, and an absence of eosinophilia and shows no recognisable haematozoa.

One feels it necessary in describing what, to most of us, is a new disease, to emphasise the importance of taking into consideration all the aspects of the case and not to rely upon the presentation of a typical temperature chart or the presence of typical "shin pains" or any other single characteristic, a mistake which is frequently made. With this reminder we are convinced that we have in this condition a disease of undoubtedly individuality quite distinct from, and in the vast majority of cases easily differentiated from, influenza, common cold biliary attack, and myalgia, on the one hand, and the enteric group, malaria, and rheumatic fever on the other, and, in its typical instances, as easily diagnosed as any better known disease, and in its atypical cases well recognised by those who have studied such numbers of cases as the medical division of any large base hospital must provide.

With regard to treatment, it would not appear that any remedies yet tried have materially modified the course of the disease, and this fact combined with the leakage of men which the wide prevalence of the disease appeared to us to cause, led us to a belief in the extreme importance of prophylaxis. Our attention was thus drawn to the mode of transmission, and with the data provided by the workers already mentioned in our possession, and also the clinical fact that direct transmission in hospital appeared not to exist, it seemed to us that the direct transmission of red corpuscles must be brought about by blood-sucking parasites. The wide prevalence of the "louse," as has been so thoroughly investigated by Lance-Sergeant A. D. Peacock, R.A.M.C., led us to the belief that these pests were the guilty agents.

An experiment was therefore carried out with a view of testing the accuracy of this belief. Some score of lice were collected and starved in captivity for three days; a number of them died. Two pairs of the survivors were taken and allowed to bite, under a watch glass, two patients suffering from "trench fever" in an acute stage. After allowing them to feed for about 15 minutes their meal was interrupted, and each of us then allowed a pair to feed upon himself, strictly confining their sphere of operation by means of a securely fixed watch-glass. The one of us whose duties did not bring him into the wards subsequently, 24 hours later, allowed his pair to have a further meal on himself. Twelve days later very startling developments took place.

The characteristic symptoms manifested themselves, and he passed through a most typical attack of the condition of average severity, with the pains and other features all present. It may be further noted that the victim had not at any time been nearer to the front than the base, nor had he been subject to any previous similar condition.

The demonstration of this mode of transmission appears to be so striking in its success and of such immediate importance that we feel amply justified in giving what is an academically incomplete research on the etiology of this important disease. The probability is that a vigorous impulse to the anti-louse campaign may be given.

## Clinical Notes:

### MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

#### ACUTE PNEUMONIA WITH HYPERPYREXIA, FOLLOWED BY HEART-BLOCK.

BY J. PORTER-PARKINSON, M.D. LOND., F.R.C.S. ENG., SENIOR PHYSICIAN AT THE LONDON TEMPERANCE HOSPITAL AND AT THE QUEEN'S HOSPITAL FOR CHILDREN, HACKNEY-ROAD, E.

ACUTE pneumonia with severe hyperpyrexia is so rare, and recovery from this rarer still, that on that ground alone it would seem desirable to record this case, in which also the fever was followed by a high grade of heart-block.

A van boy, aged 14 years, was admitted into hospital under my care on Nov. 22nd, 1916. He was a healthy looking boy, with a good family and personal history. He had been taken ill with a rigor and fever and cough four days previously. On admission the temperature was 104° F. and at 4 P.M. it had risen to 105°. There were signs of pneumonic consolidation in the whole of the lower lobe of the right lung. The patient's general condition was good. At 7 P.M., however, the temperature, taken in the mouth, registered 110°; it was taken in the rectum by two different thermometers and found to be 110° each time. On being informed of this by telephone I ordered the immediate use of iced sponging and towels. Towels wrung out in iced water were placed over the front of the trunk, and changed in succession when they became warm, and the limbs were sponged with iced water. In this way the temperature had fallen to 101° when I arrived at the hospital. The treatment was then stopped. The general condition of the patient was good, he had not been delirious or unconscious. The pulse was 120, regular and of fair volume, and there was no sign of collapse. I ordered an ounce of brandy in warm milk. The temperature was then taken each half hour and began to rise again, and at 9 P.M. was 103·6°; the cold sponging and towelling again reduced it to 103·8°, after which it slowly fell to 101°, but next day it varied between 104° and 105°, and after this until the crisis on Nov. 27th it showed no tendency to rise to an abnormal height. The course of the illness was uneventful, until on Nov. 30th, two days after the crisis, the pulse had sunk to 44. When I saw the patient the same day it was beating at that rate at the wrist. The heart's apex was not displaced, and there were no abnormal sounds heard; but I was able to show by a paper lever over the jugular vein that the auricular rate was 88 while the apex beat registered 44. The pulse was of good volume and perfectly regular in rhythm. This passed off after 48 hours, and I regret that I was unable to procure the use of a polygraph early enough to get a permanent record. After this the pulse-rate gradually rose, and was intermittent, at first every three or four beats, but getting less and less so daily until a week later when the rate was about 80, and only very rarely could an intermittency be felt at the wrist or the apex. The signs in the lungs cleared up in the usual way, and the only other feature worth noting was that the pulse rate increased considerably when the patient was first allowed out of bed, so that his convalescence was retarded in this respect for about a fortnight.

A temperature of over 106° F. is exceedingly rare in acute lobar pneumonia but commoner in broncho-pneumonia. The percentage in the former disease is said to be 0·4, and with only one or two exceptions seems to have been fatal in all the recorded cases. The fact of recovery after the temperature twice reached an extraordinary height seems, as far as I can make out from the literature, to be almost unique.

It was found that whenever iced towels were renewed over the precordial region the pulse became markedly more feeble,

and hence on the second treatment with ice this area was omitted ; if this be confirmed in other cases it will serve as a useful warning.

With regard to the heart-block, it is known that minor degrees, such as lengthening of the a.-v. interval, may often be demons rated by the polygraph, though they cannot be detected by rougher methods ; but such a marked degree as a 2 to 1 block must certainly be very rare indeed. Though Mackenzie mentions that heart-block may occur after pneumonia, he does not state to what degree. It would seem that the poison which had such an unusual effect on the heart regulation had also an unusually severe effect on the heart muscle, impairing its conductivity as well as its strength.

#### A CASE OF FOREIGN BODY IN THE RECTUM.

BY N. S. BONARD, M.D.,

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I READ with much interest in THE LANCET of Sept. 23rd, 1916 the case of foreign body in the rectum related by Mr. Joseph F. Pearl. The following case may be interesting to relate in connexion with his paper.

The patient, a man aged 23 years, came to see me at the French Hospital giving the following history. Ten days previously he was in the lavatory playing, as he said, with a long piece of iron, when suddenly it disappeared. He could not find it again, so he believed it was in his rectum. During the ten days he had no special troubles or pain, but he was much upset in thinking that perhaps he might have a piece of iron in his body which did not come out. The general appearance of the patient was strange, and at first I did not believe a word of this history and took him for a maniac or a person mentally deficient. I asked him to get upon the gynaecological chair, and made a very careful examination. Externally there was no evidence of anal or perianal lesions or inflammation. By digital examination I could not feel anything abnormal, and did not cause the slightest discomfort or pain to the patient. So I came to the conclusion that he was really mentally deficient. When he was dressed again I explained to him that he was wrong and that he must give up this ridiculous idea of thinking he had a piece of iron in his rectum, and that it would be impossible to retain such a thing for so many days in his body without having any trouble. I was on the point of sending him away when he again gave me in a few words his previous history, telling me that as he could not find this piece of iron in or around the lavatory it was certainly in his rectum. He refused to give any further details, and described the body as being as long as his forearm and as thick as his little finger. Again I did not believe it, but bearing in mind the classical descriptions in medical books regarding foreign bodies which can be found in the rectum I made a second examination with all my strength, so as to examine as high up into the rectum as I could. I was not more successful than the first time, and was just going to give it up when suddenly very high up my finger went against something very hard on the lateral wall of the bowel. I lost it, and for a long time could not find it any more. I was so certain that what I came against was a foreign body that I began to think that after all the patient might be right, and I made a third examination. After a few minutes I was lucky enough to find again the hard body, but could hardly reach it with the extremity of my finger. I moved it as well as I could, and after manoeuvring with it I felt it more movable and coming slowly down the bowel. Then I could feel at last the extremity of a piece of iron exactly as the patient said. I could not appreciate the length, but as it was impossible to move it easily, I gathered it would be rather long. By moving it little by little I succeeded in getting the lower extremity near the internal sphincter, but as soon as I withdrew my finger the body was returning to its previous position against the lateral wall where it was impossible to grasp it for extraction. At last I used a gynaecological Fergusson metal speculum, and with a long forceps, after many unsuccessful attempts, I was able to extract a long cylindrical (with sharp-cut ends) piece of iron, 9*½* inches long and as thick as the little finger. I must say I was very surprised, and the patient was very pleased that it had come out. Fearing complications the patient was kept under observation for a few days but no trouble whatever ensued.

The purpose for which this piece of iron was being used by this young man need not be dwelt upon, but I record the case to put other medical men on their guard in face of an apparently improbable story.

**ERRATUM.**—In Table III. of the Analysis of Recent Cases of Tetanus (THE LANCET, Jan. 27th, p. 133) Case O.3 should read : "F.B. lodged in ilium."

## Medical Societies.

### ROYAL SOCIETY OF MEDICINE.

#### SECTIONS OF MEDICINE, PATHOLOGY, AND EPIDEMIOLOGY.

##### *Discussion on Toxic Jaundice in Munition Workers.*

A COMBINED meeting of these sections was held on Jan. 23rd, Surgeon-General H. D. ROLLESTON being in the chair.

Dr. T. M. LEGGE said that, in the early stages of the war, poisoning by dope which contained 12 per cent. of tetrachlorethane looked as though it were going to be formidable. Nineteen cases had been detected in one factory in quick succession. That the tetrachlorethane was the culpable ingredient of dope had been shown experimentally by Dr. W. H. Willcox, and the plenum system of ventilation then in vogue in the workshops was unsuitable. The danger had been combated by periodical medical examinations, installation of exhaust ventilation, and frequent changes of employment. The tetrachlorethane had now been replaced by a substitute which was safe. From first to last about 70 cases had been heard of, with 12 deaths. Concurrently, two or three cases of toxic jaundice due to T.N.T. occurred, and this form of jaundice was made noticeable. Consideration of the cases showed, as was to be expected, that to reduce the poisoning the dose must be reduced. At first only a few cases occurred, then with an intensification of the work, which coincided with the hot weather, there were more ; in the last two months of 1916 there were fewer cases again. The incidence had been where the material was used, rather than where it was made. The skin was the main channel of absorption, as shown by the occupations of those affected. A method of exhaust ventilation could only indirectly reduce the danger from skin absorption. In addition, mechanical aids to diminish the need for handling the material had been employed. Other safeguards used were alternation of employment, periodical medical examination, and cleaner working, and these, with suitable ventilation, were the chief methods of control.

Viscount CHETWYND, managing director of a large factory, wrote saying that it was in the interest of a factory that sickness should be kept down, in view of the reduction of labour. He was led to believe that poisoning was due to fumes rather than to dust. This was shown by the example of a group of men who worked covered with dust but with easy access to the air. No cases arose among them. In another group who worked where the circulation of air was poor and fumes were more evident, the incidence of cases was 9·3 per cent. With better ventilation this percentage dropped, a similar reduction being noticeable also after a gale. There were more gastric cases among women than among men, who fed themselves better. Consequently a part of the wages of the women was withheld, and they were efficiently fed ; this was followed by a reduction of cases from 11·6 per cent. to 1 or 2 per cent. Although the amount of wages withheld did not cover half the expense of feeding them, the improvement in their health made the transaction financially successful.

Professor BENJAMIN MOORE said that the minor illnesses arising from T.N.T. were of very great importance. The number of absences from this cause at one factory was high. It was his fixed belief that it could be eliminated. He had kept animals in dense fumes for considerable periods, but they remained well. He then noticed that in a very clean factory where workers had oily hands cases occurred. Next he provoked poisoning symptoms in himself by rubbing an oily preparation of T.N.T. into his palms. In a factory he had breathed fumes and dust very systematically, but had not induced any poisoning. Most poisoning occurred among the workers who rubbed off the spilt material about the shells which should never have been there. There was an attitude of false security about the handling of T.N.T. because it was so little explosive. There should be as clean working with T.N.T. as with black powder or petrol. As preventive measures cleanliness came first, then alternation of

employment. During the periods of cessation of work with T.N.T. there must be cleanliness of the skin, changing of underclothing, and cleansing of the scalp. An organic solvent such as acetone should be used to remove the material from the skin and scalp as far as possible. The greater the degree of the cleanliness observed the less would be the incidence of illness. There should be a penalty for careless handling and if the floor became littered with dust.

Dr. B. H. SPILSBURY described the post-mortem and microscopical changes found in cases of tetrachlorethane, dinitro-benzene (D.N.B.), and T.N.T. poisoning. He pointed out that in all cases the most advanced changes were found in the liver. In large areas of this organ the cells had almost or entirely disappeared, the stroma remaining, and showing in some cases processes of organisation, with fine globules of fat as sole evidence of the previous fatty degeneration of the cells. The bile-ducts in some cases remained, and might show active proliferation and even slight attempts at regeneration of the liver tissue. The areas in which the liver tissue had not disappeared might show some hypertrophy of the liver cells, but these generally exhibited a varying degree of fatty degeneration. In all cases the kidneys exhibited fatty degeneration—generally widespread and advanced—and in most cases there was fatty degeneration also of the heart muscle. Experiments in rats with the vapour of tetrachlorethane, conducted by Dr. Willcox and himself, had shown that on exposure to the vapour for one week a marked fatty degeneration of the liver developed and less of the kidneys and heart, the other organs showing no pronounced alterations. These experiments suggested that the earlier stages of tetrachlorethane poisoning in man consisted of fatty degeneration, which in the liver led to complete destruction of many of the liver cells before death.

Dr. MATTHEW STEWART spoke of the blood changes and of the microscopical appearances of the organs. His paper was published in full in THE LANCET of Jan. 27th.<sup>1</sup>

Dr. P. N. PANTON dealt with the blood changes. He had examined the blood in the case of 50 women in one factory who were still at work and apparently well. No blood changes were found except those of minor importance. The majority showed some leucocytosis, chiefly of polymorphonuclear cells. There was no suggestion of blood destruction in contra-distinction to what had been described in poisoning by D.N.B. One hundred workers had been examined for cyanosis; 18 were definitely cyanosed, others were blue, but possibly because the day was cold. The cyanosis had been generally ascribed to methaemoglobinæmia, but he did not consider that this had been proved. He had used Haldane's test, with which 36 examples of blood were positive, but the conclusiveness of the test was difficult to be sure of. Of 100 workers, in 20 the serum was bile-tinged without evidence of jaundice, but this sign was also present in a certain number of normal people. Of 19 cases of poisoning with T.N.T., 15 of whom had toxic jaundice, nothing abnormal was found in the blood in 13. Two conditions might occur, in his opinion, with T.N.T.—(1) toxic jaundice, (2) an aplastic anaemia. He had seen four cases of the latter, two with jaundice and two without it.

Dr. H. M. TURNBULL had examined post mortem seven cases of toxic jaundice caused by T.N.T. In six of these the least damage in the liver was in the anterior part of the right lobe; in the seventh the most affected portion was the upper part of the right lobe. The destruction was greatest in the parts most remote from the portal blood-supply. The condition resembled portal cirrhosis of the liver in the patches where the destruction was not complete. In some cases there was regeneration. The changes had not always been progressive. In one case a large liver was met with, showing only three very small areas of complete destruction and elsewhere reticular fibrosis. Another case was one of very severe anaemia without jaundice, and was erroneously thought to be an example of pernicious anaemia. The liver showed fatty degeneration in the centre of the lobules as occurs in severe anaemia (there was no iron), but in another part the lesions were like those of T.N.T. Two other cases of men with extremely severe anaemia were examined. They were examples of aplastic anaemia, and very little marrow was found, but in it were many plasma cells and phagocytes

containing chiefly erythroblasts. There appeared to be an actual destruction of the marrow by the poison.

Mr. I. FELDMAN raised the question of the possibility of another toxin being present in T.N.T. cases, and thought that Webster's test should not be regarded too absolutely as determining the existence of T.N.T. poisoning. He cited a case which had occurred seven weeks after the last exposure to the poison, and in which no trace of T.N.T. was found in the urine or faeces. In two animals which had been poisoned with T.N.T. no trace of T.N.T. was found in the organs, and in a fatal case the same absence of T.N.T. in the organs was met with. Among the early symptoms were a very definite dark-brown colour of the urine before jaundice was noticeable, urgency in micturition, and lassitude, the patients feeling faint and weak. A later symptom in one case was the appearance of leucin and tyrosin crystals in the urine. The metabolic activity of the liver was not affected as far as urea was concerned.

Dr. W. J. O'DONOVAN dealt with the clinical aspects. The typical manifestations could be classified into five groups: (1) Dermatitis; (2) an irritative gastritis evinced generally during the first week of employment, and cured by simple treatment and a few days' holiday; (3) a toxic gastritis; (4) effects upon the blood and blood-forming organs; and (5) toxic jaundice. Toxic gastritis was due to T.N.T. absorption; its symptoms were colicky epigastric pain, often severe, and having no relation to meals, constipation, anorexia; wasting and sometimes vomiting were associated symptoms. It was difficult to diagnose this from gastritis due to other known causes, but the wizened pallor of the face of these T.N.T. cases was very striking. Another common sign of T.N.T. absorption was cyanosis, but neither this nor gastritis were reliable warnings that jaundice might supervene. Of 30 cases of toxic jaundice, in 15 the jaundice was the first sign to call for notice. In 1916 about 50 deaths had occurred from toxic jaundice, a mortality among those exposed of 0·05 per cent. The total sickness incidence had in one factory been as high as 11 per cent., but the sickness incidence and the mortality rate in cases of jaundice had both steadily lessened. Jaundice might supervene at a very early or late period of employment, from the fourth day to the ninth month, and it might first appear after an absence up to two months of freedom from exposure to absorption. The prognosis of a case of toxic jaundice was uncertain; when recovery was expected coma or convulsions might suddenly supervene. But with the early detection of icterus the prospects of the chances of recovery were much greater. A second attack should not occur, because a return to T.N.T. work from recovery from toxic jaundice was forbidden, but he had seen one such case; in this the man after a return to T.N.T. work became again icteric and in addition very pale; the serum contained bile pigment and the blood showed a marked absence of bone marrow reaction. Since Professor Moore's investigations were reported great attention had been paid to the prevention of the possibilities of skin absorption.

Mr. J. A. P. BARNES said that an observation of 1100 workers had borne out in the main the contention that the channel of absorption was chiefly the skin. He had found that among employees working with greasy hands the incidence had been 17 per cent., as compared with 10 per cent. among others. In two groups of workers the hands were brought into close contact with the powder. Among these there were toxic symptoms in 10 per cent.; in all the others this occurred in 1 per cent., in spite of exposure to fumes in the case of some of them. He thought that the mucous membrane was also a channel of absorption in the case of women who wore suction plates, between which and the mucous membrane a sandwich of powder collected and remained all night, as the women were often advised by the dentists not to remove these plates at night. Girls, after a few days at the work, often suffered from severe mental depression; this was afterwards replaced, when serious jaundice occurred, by a state of exaltation, probably toxic, and reminiscent of the spes phthisica. He hazarded the suggestion that excretion plays a large part in the elimination of the toxicity of T.N.T. He had transferred a group of ten workers from a well-ventilated building to one less well ventilated and more confined; they deteriorated in health, while those who replaced them, coming from the worse ventilated building, improved considerably. He had endeavoured to find out whether any after-effects occurred in those who had formerly worked on T.N.T., and constipation was commonly complained of.

<sup>1</sup> In commenting last week upon this paper we alluded to 12 cases of accidental death in munition workers which Dr. Stewart had studied. In one of these distinct liver changes were found. But the main conclusions of the paper were based upon the examination of seven fatal cases of T.N.T. poisoning.

Dr. W. R. SMITH gave his experiences in a shell-filling factory. Up to Jan. 20th there had been 62 cases of toxic jaundice with 16 deaths, 10 in men and 6 in women. Six cases had occurred in youths under 18, with 4 deaths; the employment of juveniles was then stopped. There had been a steady falling off in the number of cases due to several factors, the most important being efficient ventilation. Another beneficial factor was the introduction of intervals during the shifts for relaxation, feeding, and walking about. All the women were supplied with two good meat meals daily. Thorough preliminary examination of employees had been introduced and free dental advice and treatment provided on the spot. Finally, pressure had been applied to make the cases report earlier. A most striking clinical feature was the reluctance of most cases of toxic jaundice to admit that they were ill in the early stages. No dermatitis had been met with among the jaundice cases. Nausea and anorexia were usually present early. Constipation was almost invariable. Purpura occurred in three cases; in one around the nail-beds, in one in the mucous membrane of the mouth and lips. Drowsiness and sometimes maniacal violence occurred. In one case tetanic convulsions and opisthotonus simulating cerebro-spinal fever were met with. Absolute rest in bed was essential even in the mildest cases. CaCl<sub>2</sub> might be used if there was any suggestion of hemorrhage.

Major O'REILLY said it was noteworthy that no ill-effects from T.N.T. had been noted before the war, even among juvenile workers. The cutaneous affection was most frequently met with during the first week of exposure, the hands, wrists, face, and neck, and occasionally the ankles being the chief sites. Itching occurred. It was followed by a fine desquamation and was not generally severe, but yielded to simple ointments. The toxic effects presented themselves in three forms: the gastric type (usually with cyanosis), toxic jaundice, and the anaemic type. These were not different stages, but distinct types. The gastric type occurred at all periods of exposure and was marked by listlessness, pallor, cyanosis, an icteric tinge of the conjunctive, depression, nausea, giddiness, faintness, pain behind the xiphisternum, and constipation. It was remediable by suitable treatment and left no after-effects. The chief diagnostic aids were constipation, the pallid pinched appearance, and the epigastric pain. He had not seen the toxic jaundice form emerge from the gastric form. It appeared suddenly and did not differ at first from ordinary catarrhal jaundice. The liver might be enlarged in the early stages. In three fatal cases meningeal symptoms appeared, leading to coma and death. The anaemic cases looked like examples of pernicious anaemia, but though the colour index might be high there were no nucleated red cells. Speaking of the treatment, he said that the use of acetone had been encouraging. From the point of view of prevention, great attention had been paid to the teeth, which were inspected once a week. Gloves, veils, and respirators were supplied, and change of employment given fortnightly. The workers were warned to change their clothes when at home. Milk was supplied free. Washing of hands was insisted upon, and ointment was supplied in each workshop.

Dr. MORLEY FLETCHER referred to a case of toxic jaundice under his care in hospital in which saline infusions and venesection had had no beneficial effect in contradistinction to what he had experienced in cases of acute yellow atrophy. The blood was noticed to be very tarry. He queried whether these methods had been useful in other cases and whether they should be employed in early stages. The cerebro-spinal fluid had been found bile-stained after death in a case in which it was clear during life.

Fleet-Surgeon R. C. MUNDAY, R.N., recorded his experiences in the Admiralty munition establishments. There had been a complete immunity from toxic jaundice; this he explained by the greater degree of cubic space provided, the absence of piece-work, better discipline and cleanliness, and better ablutionary arrangements. He thought it was better to remove the fumes from their source than from the bottom of the room. Alternation of work was provided very fully. Scrupulous cleanliness was observed and soiling of shell-cases was prevented. There was an absence of dust on the floors. The workpeople were clean. He agreed that the skin was the chief channel of absorption. At the naval air stations no case of dope poisoning had occurred, the alternation of work among those employed being very perfect.

Dr. EMMA C. PILLMAN said that it was difficult to state when toxic jaundice started, as 15 per cent. of women workers had yellowness of the conjunctive, probably due to constipation, before commencing work. All cases of jaundice could not therefore be notified with advantage.

Dr. MARY A. S. DEACON and Dr. H. G. P. CASTELLAIN concurred as to the frequency of bile-tinged conjunctive before exposure to T.N.T.

## Reviews and Notices of Books.

**1. The Diagnosis and Treatment of Heart Disease.**  
By E. M. BROCKBANK, M.D.Vict., F.R.C.P. Lond. Second edition. London: H. K. Lewis and Co. 1916. Pp. 120. Price 3s. 6d. net.

**2. Clinical Disorders of the Heart Beat.**

By THOMAS LEWIS, M.D. Lond., F.R.C.P. Lond. Third edition. London: Shaw and Sons. 1916. Pp. 118.

1. We welcome the second edition of this excellent little manual on "The Diagnosis and Treatment of Heart Disease." As a practical guide to examination of the heart we know nothing better. The pages dealing with treatment are also most helpful, giving a very complete outline of principles and a survey of the various remedies found by experience to be of benefit. We congratulate the author upon such a sane combination of the older methods of clinical examination and the newer introductions of the electro-cardiogram school. No doubt the explicit directions and the care spent upon the detection and elucidation of heart murmurs will seem matters of supererogation to those who regard these morbid signs as of less value in the study of heart disease than was formerly taught, but we are in agreement with the author in this matter. The section dealing with the significance of the patient's symptoms is full, as is also the account of the arterial and venous pulses; the chapter on cardiac irregularity serves as a clear introduction to this more recent branch of heart observation. Amongst many points which we read with satisfaction we note the emphasis put upon the need for searching carefully for an aortic diastolic bruit in any suspected case of aortic regurgitation, and upon the fact that such bruit is very often heard only down the left margin of the sternum. There is a useful paragraph upon "posture murmur," another upon what the author terms the "apprehensive heart," and a third upon the effects of rheumatism upon the heart in children. These are only three of many such helpful paragraphs. There is very little of criticism to say. But on p. 23 "sounds" are spoken of as being "felt"; and on p. 94, speaking of acute pericarditis, the sentence "its presence is recognised by the associated endocarditis, by some respiratory distress, and by pericardial friction," might be re-written with advantage. On p. 45 the reference (p. 46) should be (p. 37).

2. The third edition of Dr. Lewis's little work follows speedily upon the second, and the fact shows clearly the importance of, and interest taken in, the newer study of heart disease by means of special instruments. We have recently<sup>1</sup> dealt fully with Sir James Mackenzie's latest statement of his work and of his experience in this direction. Dr. Lewis's book gives the student and the practitioner a clear synopsis of the facts up to date and an exposition of current hypotheses to explain them. The author writes with a lucidity and with an accuracy in the use of words that serve to simplify what many readers find a very difficult subject. His early chapter on the common types of disorder of the cardiac mechanism and their meaning serves admirably as an introduction to the subject, and by its simplicity it coaxes the student into the more serious parts of the subject that follow. These parts are dealt with under the headings: Sinus Irregularities, Heart-block, Premature Contractions, Paroxysmal Tachycardia, Auricular Flutter, Auricular Fibrillation, and Alternation of the Pulse. The material of the book is so arranged that it is quite possible for the reader to omit any close study of the various curves which illustrate the text and still to preserve continuity in the argument. Indeed, we think this method of reading the book might be quite a good one for the student or practitioner to whom the subject of heart irregularities is

new and its nomenclature strange. The practitioner with clinical experience will have little difficulty in co-relating his own bedside and consulting-room observations with the author's admirable generalisations. At the second and later perusals of the book the technical details of the electrocardiogram tracings can be studied by the help of what is still an unfamiliar terminology. In connexion with each of the above types of disorder of the heart mechanism the author discusses prognosis and treatment, and these sections are written with the same careful clearness as are those dealing with diagnosis. We recommend the book very heartily, and we are not surprised to find that it has been in such demand as to necessitate this new edition.

#### *The Cure of Obesity and Obese Heart.*

By J. S. KELLETT SMITH, F.R.C.S. Eng. London: J. and A. Churchill. 1916. Pp. 93. Price 3s. 6d. net.

In this small book Mr. Kellett Smith has dealt fully with the principles and practice of the treatment of obesity by passive ergotherapy, more generally known as the Bergonié treatment. But although this particular method of treatment is the chief *motif* of the book, the author shows his freedom from any sort of obsession by giving due prominence to the question of diet, of voluntary exercise, and, in special cases (for the due recognition of which he gives very useful directions), of the administration of thyroid extract. Indeed, the author emphasises the importance of combining the various known principles of treatment of this particular metabolic defect. Exact details are given of the mode of application of the special faradic current used to cause the muscular contractions, and the immediate and remote effects are duly recorded. In the case of fatty heart the use of graduated exercise in conjunction with the Bergonié treatment and dietary is described fully. We cordially recommend this monograph to all practitioners who have to deal with obese subjects.

#### *Eclipse or Empire?*

By HERBERT BRANSTON GRAY, D.D. Oxon., and SAMUEL TURNER. London: Nisbet and Co., Limited. Pp. 316. Price 2s. net.

MUCH in this book may be studied with advantage. The authors' text is: "Forty years ago Great Britain was still the workshop of the world. To-day she is not"; and they show where "she is not" and why "she is not." Their arguments are familiar, and their force and truth will be recognised in intelligent circles. The facts contained in a glossary of 179 pages out of a total of 307 afford most interesting and serious reading, and disclose that a large proportion of the new ideas and inventions which have been evolved during the last 40 years have been due to other nations than our own, and in so many (too many) instances where inventions have been British their value and utility have been more greatly appreciated and supported in foreign countries than at home. This is not as it should be, and the authors' aim in bringing these facts forward is to drive the nation out of its apathy, so that we may resume that supremacy which we once held and be prepared for the alarm of peace—for the trade war which will follow the war of armies and navies. On the whole the authors make out their case with success, but occasionally they are inclined to discount the rôle of the British too heavily. Under the title of "The Healing Art," for example, they state that there is clear evidence that the new ideas, discoveries, and developments in this branch of human activity have, for the most part, had their source abroad. We do not think this is a correct interpretation of facts, even when considering their own analysis of historical developments, and the Germans, at all events, do not figure so conspicuously in the list as do other nations. The British, at any rate, may lay claim to initiative in their work on cholera, malaria, typhoid, Maia fever, cerebro-spinal meningitis, and sleeping sickness, while German investigation has borne chiefly on diphtheria and syphilis. The X-ray discovery by Roentgen, again, was based on an English vacuum tube and the dynamo was Faraday's wonderful conception. In many cases, however, it is right to claim that the superstructure of a discovery made in this country has been reared largely by German scientists. This is the main lesson for us to

learn, and we are rapidly learning it, as is shown by our increasing output of chemicals, dyes, glass, and other products formerly supplied to us exclusively by the enemy. The book is very plain in its teaching and the subject-matter should receive a widespread and careful study. It provides an interesting balance-sheet, showing fairly, on the whole, our industrial position in the world's affairs, and our position is certainly not always to our credit.

#### JOURNALS.

*British Journal of Inebriety.*—The issue for January contains an interesting and valuable article by Dr. J. W. Ballantyne on Alcohol and Ante-natal Child-Welfare. In his discussion of the subject Dr. Ballantyne, following the convenient method adopted by him in previous work, subdivides ante-natal life into three periods—the foetal period extending over seven months prior to birth, the embryonic period, comprising the earlier phase subsequent to the conjunction of the ovum and the spermatization, and the germinal period stretching away back into the lives of the parent organisms. The influence of alcohol circulating in the parental blood is different in degree in these different periods. In the foetal epoch the developing offspring has an intimate and highly specialised relationship with the mother through the placenta, which probably to some extent impedes the free access of alcohol to the fetus. Dr. Ballantyne notes that the experimental evidence regarding the filtering power of the placenta is in some points conflicting; he leans to the view of Nicloux that alcohol passes through the structure freely, but he considers that the foetal tissues at this stage are fairly resistive, so that the damage done by the drug is less than when it acts on the embryo or the germ cells. As confirming this view he remarks that clinical evidence has shown that the elimination of alcohol in the second half of pregnancy may be followed by the birth of healthy children, even to mothers whose precreative career, under the influence of alcoholism, had already shown still-births and abortions. With regard to the effect of alcohol during the embryonic period, it is difficult, from the nature of the case, to get experimental data in mammalian animals, and most of the work bearing on the question has been done in the hen's egg. The most extensive and important researches in this department—those carried out by Charles Féé—gave conclusive evidence of the power of alcohol to retard growth and to arrest or misdirect development. Presumably, it may have a similar action in mammals, including man; but in this connexion it is to be noted, as the author points out, that the embryo has some protection from the decidua membranes. More definite and important evidence is available as to the effect of alcohol in the germinal period of ante-natal life, and in discussing this point Dr. Ballantyne lays special stress on the recent work of Stockard, whose careful experiments he considers to be decisive. Stockard's results, taken in conjunction with Bertholet's observations regarding the pathological changes in the reproductive glands of drunkards and with the clinical data as to heredо-alcoholism, lead him to formulate the conclusion that alcohol produces its most serious and lasting evil effects upon the individual and the race in the germinal epoch. A very full and up-to-date list of the literature of the subject still further enhances the value of this very important paper. Comments on Dr. Ballantyne's article by some members of the Society for the Study of Inebriety are also given.

**BRIGHTON HOSPITAL SUNDAY.**—The balance-sheet of the Hospital Sunday collections in Brighton, Hove, and Preston shows that the total received amounted to £1005 8s. 4d., as compared with £1007 6s. 4d. in the preceding year. In the allocation of the fund, the Royal Sussex County Hospital received £432, the Dispensary £118, and the Children's Hospital £90, ten other charities also participating.

**HASTINGS AND MENTALLY DEFECTIVE CHILDREN.**—It is satisfactory to find that the municipal authorities at Hastings are proceeding with their schemes, which were initiated in pre-war days, for the care and education of mentally defective children. A special school has recently been opened at Hastings which provides accommodation for 40 children, and those who are being specially catered for are the feeble-minded and those who are feeble because of their physical condition or the surroundings in which they are brought up.

# THE LANCET.

LONDON: SATURDAY, FEBRUARY 3, 1917.

## Infective and Toxic Forms of Jaundice.

IT is familiar knowledge that some forms of jaundice may occur under epidemic conditions, and as long ago as 1886 WEIL described the form of febrile jaundice associated with nephritis and splenic enlargement which has been generally regarded as the type of infective jaundice. But before this, in 1866, WEISS had described an epidemic as one of "infective jaundice," and even earlier the French school of pathologists had recognised the infective character of some of the conditions in which jaundice was the prominent symptom. Dr. A. F. HURST calls attention to this early French work in a letter in our columns this week. War often serves to spread epidemic disease and so to afford special opportunities for observation and research. In the South African War epidemic jaundice occurred among our troops, but it was variously regarded by different observers, some describing it as infectious, while others attributed it to gastro-intestinal catarrh. In the present war pathological work has been pursued far more systematically, and recently some interesting and important observations have appeared which have served to enlarge considerably our knowledge of the etiology of jaundice, and which therefore merit careful study. An interesting record of observations upon cases of infective jaundice was given in THE LANCET of Jan. 27th by Captain A. STOKES, Captain J. A. RYLE, and Captain W. H. TYTLER, and a careful analysis of 178 cases appears in the *Quarterly Journal of Medicine* (vol. x., Nos. 37 and 38) by Colonel Sir BERTRAND DAWSON and Lieutenant-Colonel W. E. HUME. In both papers due acknowledgment is made to the work of a group of Japanese observers, Drs. INADA, IDO, HOKI, KANEKO, and ITO, who, from the study of a disease associated with jaundice, haemorrhages, and albuminuria occurring under endemic and epidemic conditions in the western part of Japan, first demonstrated the presence of a spirochete as the causal agent. Their observations seem to be amply confirmed by the British observers, and there can be no doubt that, at any rate, some of the cases occurring among our soldiers in Flanders are identical with the disease investigated by the Japanese authors.<sup>1</sup>

The general clinical features of the condition are clearly delineated in both of the papers to which we have referred. Captain STOKES and his co-workers describe the onset as strikingly uniform,

being acute, often ushered in by a shivering fit, and accompanied by vomiting, headache, and pains in the back and limbs. There is generally fever varying between 103° and 105° F., and often great prostration and lassitude. Jaundice seems to appear usually on the fourth or fifth day of the illness, and becomes progressively deeper until the ninth or tenth day, after which, as a rule, it fades rapidly. The tongue is dry and brown in colour. Vomiting, which is almost constant in the early stages, is frequently bilious and sometimes blood-stained. Constipation seems to be the rule in the disease, and the stools are usually bile-stained, while labial herpes occurred in 42 per cent. of the cases and invariably became haemorrhagic. Other haemorrhages seem to occur frequently, at any rate in severe cases, giving rise to haematemesis, haemoptysis, epistaxis, and occasionally purpura. The urine is very deeply coloured as a rule, and albuminuria is almost constant, varying from a faint trace to a considerable amount. Microscopical examination shows tube casts and red blood corpuscles. In the more severe cases torpor was noticed, progressing to the typhoid state and accompanied by rambling delirium. The account given by Colonel Sir BERTRAND DAWSON and Colonel W. E. HUME is identical in almost all respects with that given by Captain STOKES, except that a gradual onset was more often noted by the former, especially in mild cases, and the liver was more frequently found to be definitely enlarged. An interesting account of the morbid anatomy illustrated by admirable plates is given by Sir BERTRAND DAWSON and Colonel HUME. The mucous membrane of the duodenum in fatal cases was found to be oedematous, congested, and dark blue in colour. There was usually swelling round the orifice of the bile duct, but the ducts themselves presented the natural appearance. Though some changes were found in the liver by Captain STOKES, they do not appear to be present as a rule. In 1914 INADA and IDO demonstrated the presence of a spirochete in the livers of guinea-pigs infected with the blood of patients suffering from the disease, the animals developing jaundice with pyrexia and albuminuria. Afterwards they showed the presence of the same spirochete in the blood of patients and in the tissues of some fatal cases. They also proved the presence of protective substances in the blood serum of patients recovering from the disease. Their observations suggest that in the early stages the spirochete is in the blood stream, but that after the fifth day it gets more inconstant as the development of immune substances in the blood proceeds. After the tenth day they found the spirochete in the urine, whence it has been recovered as late as the thirtieth day. They were of opinion that the portal of entry of the spirochete was the alimentary canal, but admitted that there was a possibility of infection occurring through the skin. Subsequently they were able to cultivate the spirochete outside the body. Practically all these observations have been amply confirmed by the British observers, as well as by Dr. L. MARTIN and Dr. A. PERRITT in the French Army, who demonstrated further that the incubation period in an

<sup>1</sup> The case for the spirochete as causal agent of infective jaundice is strengthened by a successful attempt of some of the same Japanese investigators, described at p. 192, to apply the principles of passive immunisation to the treatment of the condition.

accidental infection of one of their colleagues was six to eight days. So far, Captain STOKES and his co-workers have not been able to grow the spirochæte outside the body. Some recent observations by the Japanese observers, also confirmed by Captain STOKES, suggest the possibility of the field rat being an agent in the spread of the disease.

Since the outbreak of war the occurrence of toxic jaundice in munition workers has drawn special attention to another form of jaundice, and recently a discussion on this subject has been held at a combined session of the Sections of Medicine, Pathology, and Epidemiology of the Royal Society of Medicine, of which a report appears in the current number of THE LANCET. Toxic jaundice is a well-recognised condition and one form of it—namely, that due to phosphorus poisoning—has been investigated extensively by toxicologists, physiologists, and pathologists. The haemolytic nature of some cases of toxic jaundice was established by the experiments of STAEDLMANN and W. HUNTER with tolulylene diamine. In 1915 Dr. W. H. WILLCOX and Dr. B. H. SPILSBURY recorded their observations upon an outbreak of toxic jaundice of a new type amongst aeroplane workers.<sup>2</sup> They proved that this condition was due to tetrachlorethane used in a dope or cellulose varnish. Dr. SPILSBURY's observations upon two fatal cases, and upon the condition experimentally produced in animals, demonstrated that there was a toxic fatty degeneration of the liver, starting in the central zones, then spreading through the lobules, and leading to necrosis. This was followed, if the patient survived sufficiently long, by replacement fibrosis. Fortunately, the occurrence of this condition has now been entirely prevented by appropriate measures and by the use of a safe substitute for tetrachlorethane. A condition of similar character has, however, been observed in some workers with trinitrotoluene. Several of the speakers at the discussion at the Royal Society of Medicine pointed out that the symptoms of poisoning by this substance comprised early cutaneous irritation and dermatitis, toxic gastritis, aplastic anaemia, and toxic jaundice. The blood changes were carefully described by Captain MATTHEW J. STEWART, whose remarks were published in full in last week's issue of THE LANCET. The most striking feature is a neutrophil leucopenia, due, presumably, to a progressive failure of the leucoblastic function of the bone marrow. In one case Captain STEWART found a neutrophil leucocytosis; lymphocytosis was present in many cases, eosinophilia in a few. The changes in the erythrocytes and haemoglobin were less marked as a rule, but in three cases the anaemia was of the pernicious type. The changes found post mortem in the liver in fatal cases were similar to those previously found by Dr. SPILSBURY in tetrachlorethane poisoning. Captain STEWART describes them as being of a character between a subacute yellow atrophy and an ordinary multilobular cirrhosis of irregular distribution.

In both of these conditions, the spirochætal infection and the trinitrotoluene poisoning, it is

important to notice that jaundice is not an essential or invariable symptom. The spirochætal form of jaundice appears to be a true obstructive jaundice due to swelling and partial occlusion of the bile papilla, but both Captain STOKES and his co-workers, as well as Sir BERTRAND DAWSON and Colonel HUME agree that cases of spirochætal infection can occur without jaundice. The latter observers deprecate the use of the term "Weil's Disease" for the spirochætal form of jaundice, since they point out that other forms of infective jaundice occur and that in the disease described by WEIL the infective agent is believed by some authorities to be the *Bacillus proteus fluorescens*. It seems to us that their objection is well founded and the alternative name Spirochætosis icterohæmorrhagica is preferable, in spite of its somewhat cumbersome character. The toxic forms of jaundice here considered seem clearly to belong to the haemogenous group, and again it is important to remember that poisoning by these toxic substances may occur without jaundice. A recognition of the facts shows that a wider view of both conditions must be taken if satisfactory diagnosis is to be expected, and that too much attention must not be paid to the factor of the jaundice. We can commend the papers to which we have referred to our readers for careful study, since they contain much interesting information and many useful suggestions in regard to diagnosis and treatment.

### Gunshot Injuries of the Spinal Cord.

In the Bradshaw Lecture recently delivered before the Royal College of Surgeons of England, and published in THE LANCET of Jan. 20th, Colonel CHARTERS J. SYMONDS, A.M.S., took for his subject the surgical treatment of gunshot injuries of the spinal cord, and dealt in an interesting manner with an important theme. For every surgeon who has had much to do with the treatment of the wounded in the present war has found out the dismal fact that there is no other injury of any organ of the body which approaches gunshot injuries of the spinal cord in the rate of mortality, and this is especially evident when we consider not only the deaths which occur within a short time of the infliction of the injury but especially when we take into account those resulting from complications which may not ensue until weeks or months after the infliction of the injury. The latter aspect of the subject has been fully dealt with by Mr. J. W. THOMSON WALKER in a Hunterian Lecture, delivered before the same College and published in our columns this week. It is a valuable contribution, and contains suggestions for the avoidance of fatal renal infections which command attention.

The injuries which the spinal cord may suffer vary from a mere bruise to complete severance, and the symptoms and treatment will therefore vary in the very greatest degree. It is fairly well established by now that a bullet may cause concussion of the cord with complete paralysis of all the nerves given off below, even though the bullet has never come in contact with the

<sup>2</sup> Med. Soc. Trans., 1915, xxxviii., 129; THE LANCET, 1915, i., 544.

cord; fortunately, in these cases the rule is that complete recovery follows. The fear of meningitis restrains many surgeons from dealing as freely with injuries of the cord as they otherwise might, but it is strange how little a tendency there is to the production of spinal meningitis, even in cases where suppuration is present and where a puncture in the dura mater exists. There may be a discharge of cerebro-spinal fluid for days or weeks, and yet no meningitis may occur. Only it is essential that there should be good drainage, so that there may be no tension—if the wound be closed or ill-drained meningitis is likely to follow. Therefore the mere presence of sepsis in a wound need not prevent the surgeon removing fragments of bullets or shell from the neighbourhood of the cord, even when the dura mater has been perforated. In such cases an early operation provides for the removal of the foreign body and for thorough drainage of the wound. When, in injury of the spinal cord, it is clear that there is complete loss of continuity of the cord, the wound having healed, any operation to remove fragments of bullets or shells is, as a rule, absolutely useless. There is, however, one exception to this rule, and that is when the pressure of the piece of projectile or displaced bone is causing pain. The relief of pain following operation may sometimes be exceedingly great, and a patient who has needed morphia frequently may be able to dispense with it entirely. But one difficulty presents itself: it is frequently impossible to prove with absolute certainty that there is complete transverse division of the cord, and in a case where there is any doubt it is clearly advisable to operate. When the slightest evidence of continuity of the cord exists an operation is imperative, and the earlier the operation is performed the better for the patient, care being taken to exclude from this rule cases of mere concussion.

Laminectomy being decided upon, the X rays will show the position of any metallic fragments, though, unfortunately, depressed portions of lamina may be quite invisible in the skiagrams, so that we must not trust them implicitly or invariably to supply the actual cause of pressure on the cord. It often happens that at the operation the surgeon finds that a portion of a lamina is obviously exerting pressure on the cord, when not a sign of its presence had been afforded by the X rays. An important question arises at this stage, shall the uninjured dura mater be opened? The answer must depend on whether compression of the cord can result from the pressure of a blood-clot within the theca. Some surgeons consider that it may, but Colonel SYMONDS holds the contrary view, and he bases his opinion on the fact that in the cases treated in the South African campaign no such cases were found, and that he has never met with the condition himself. While it can hardly be denied that it may occur, it must be rare. An opening of the dura mater adds, however, little to the danger of a laminectomy, and septic meningitis practically never follows it. When the lesion is situated in the cauda equina the conditions are different, for the nerves there

will unite after suture in the same manner as any peripheral nerve; therefore a damaged portion may be excised and the ends brought together with a great expectation that they will unite with a full restoration of function. This certainly cannot be done with the cord itself, though many attempts have been made. Even experiments on the lower animals to suture the spinal cord have all failed. The cord may certainly recover much of its lost function without operation, but no one can doubt that a timely removal of pressure must go far to assist the cord in its recovery.

We may sum up by saying: that in gunshot injuries to the spinal cord an early operation offers the best chance for the patient; that fear of the presence of sepsis need not deter the surgeon from operating; and that not until the surgeon has exposed the spinal dura mater can he speak with any certainty as to the mode in which pressure is being exerted on the cord. It may well be that in the future we shall be able to deal more actively with injuries to the cord, but at present all that the surgeon can do is to relieve pressure and to hope that the cord will be able to recover in part at least from the injury which it has sustained. Experience has shown that in a certain proportion of cases of injuries of the spinal cord much may be done, though in others all the surgical knowledge and skill which we now possess are insufficient to do any good. Workers in this branch of surgery feel that there are many points which can hardly yet be called settled, and Colonel SYMONDS has discussed them most illuminatingly in his lecture.

## Annotations.

"*Ne quid nimis.*"

### LESS BEER AND MORE BREAD.

No one can quarrel with the conclusion that to-day bread should claim greater respect than beer. The conservation of cereals for food purposes is of the utmost importance and it is absurd to contend seriously that beer forms, or has ever formed, an essential constituent of our food. Bread is a food and beer is a beverage, and these are quite different categories. Few people drink beer because it happens to contain a certain proportion of nutritives in the form of malt sugar, dextrin, and some proteins; it is appreciated as a pleasant, and, in the majority of cases, wholesome drink, and these qualities have made it the national beverage. But although beer does not contain a large amount of nutrient material, there is good reason for saying that in the healthy individual it favours the assimilation of food in a manner akin to such condimental substances as pepper, salt, and vinegar. Beer certainly contains, amongst other things, the vitamines in a remarkable amount, as might be expected having regard to the chemistry and physiology of its raw materials and the method of its production. There is, therefore, little question that beer increases assimilative power, thus adding to the nutrient value of the foods partaken with it. In spite of these considerations the increased output of bread at the expense of beer materials is clearly a sound policy when a shortage of food

supply is to be avoided. Bread and water in reasonable quantities will sustain life; the equivalent in beer would be an inconvenient bulk of material, and, besides, would introduce more alcohol than would be good for the consumer. Thus a pint of beer of moderate strength would, broadly, be equal in food value to 1½ ounces of bread; a pint of light beer would be worth about half this in nutritive value. So we may dismiss any suggestion that beer is a material food, for assuming, at a low estimate, that the daily consumption of bread is half a pound only, the equivalent of this, as regards nutritive value, would be 8 pints of ordinary beer, and a larger measure of light beer. This comparison renders the claims for beer as a direct and economic food material inadmissible, and shows how sound is the action of the Food Controller in further restricting the output of beer so as to husband the supply of grain for direct food purposes. The good sense of a similar restriction in regard to the output of spirits made from farinaceous products is obvious, though exception can be made in the case of wines which are made from the grape. The grape, unlike grain or the potato, is a perishable article, and its conversion into wine would not cause any interference with the supply of food. Brandy disappears automatically with the call upon wine for the use of the troops in France, and its rapidly advancing price will soon become prohibitive to purchase, in which case any restrictive order might well be superfluous.

#### THE PRESCRIBING OF COCAINE.

WE learn that it has been brought to the notice of the Home Secretary that the requirements of the Defence of the Realm Regulation 40B concerning prescriptions containing cocaine are not being fully carried out by all medical practitioners. A warning has therefore been issued from the Home Office stating that it is obligatory on every practitioner, when giving such a prescription, to date and sign it with his full name and address and qualifications; to mark it with the words "Not to be repeated"; and (except where the medicine to be supplied is a proprietary medicine, in which case it is sufficient to state the amount of the medicine) to specify the total amount of cocaine to be supplied. Failure to comply in any respect with these requirements is an offence against the Regulation which is punishable summarily, and pharmaceutical chemists are forbidden to dispense cocaine on any prescription which is not in compliance with the requirements.

#### AN AMERICAN OPINION ON BIRTH CONTROL.

Dr. T. D. Crothers, who read a paper recently before the Medico-Legal Society of New York upon the subject of birth control, that is to say, of the prevention of child-production by unsuitable parents, is an uncompromising advocate of State-exercised compulsion in such matters. The object sought is one which all will admit to be desirable, but whether the means necessary to attain it with anything approaching to certainty will ever commend themselves to the public in our own country is another matter. It is enough to say that appeals to potential parents of the undesirable class are not likely to produce any general results, and that it may be rash to prophesy what future generations will consider expedient. In the

United States, as in European countries, it is observed that the fewest births are found in the families best able to support and bring up children. On the other hand, in families where conditions of heredity and environment are most adverse the largest numbers of births are found. In these circumstances Dr. Crothers recommends the compulsory sterilisation of criminals, idiots, epileptics, inebrates, and drug-takers, the destruction at birth of abnormal or defective children, and he would "hold the parents responsible and make it the highest crime to attempt to give birth to defective children." The last-mentioned offence appears to be rather obscurely defined in the summary before us, but the intention is fairly clear. Dr. Crothers cites, as an illustration of the spirit in which he would legislate, an old Chinese custom, which consisted in fining the parents of an assassin as well as executing the criminal, the parents themselves being put to death if a second of their children committed a similar offence.

#### THE SERUM TREATMENT OF SPIROCHÆTOSIS.

AT the time of their discovery of the spirochæte of Weil's disease Professors Inada and Ido claim also to have found in the blood of convalescing guinea-pigs immune substances which dissolved and killed the spirochæte. Ido was shortly afterwards able to demonstrate a remarkably potent effect of the serum of immunised goats upon the disease in the guinea-pig. If injected before jaundice appeared the attack was in every case cut short. Salvarsan had, contrary to expectations, exerted very little effect on the disease in man, and the Japanese observers proceeded to carry out investigations on the value of serum treatment in patients, the results of which are set out in a paper signed by Inada, Ido, Hoki, Ito, and Wani in the *Correspondenz-Blatt für Schweizer Ärzte* of Jan. 20th. The serum first used was that of human convalescents, later that of horses ultimately immunised to tolerate an injection of 800 c.c. of a pure culture of spirochætes containing 30 organisms to the microscopic field (1/12 oil immersion, ocular 3). But serum of this extreme potency could not be obtained for the treatment of patients as it was not prepared until cases of the disease were no longer available. Thirty-five patients were treated, 23 in hospital and 12 in a coal-mine. At first 10 c.c. of serum were injected on each of three successive days, but this dose was soon found to be insufficient, and finally 60 c.c. were given within 24 hours in divided doses intravenously without any harm resulting from sudden lysis of the spirochætes. In 24 cases jaundice was present before serum treatment was begun. The authors employ five criteria to judge of the result of treatment: (1) The death-rate of 23 cases serum-treated in hospital was 17 per cent., compared with 31 per cent. in the cases treated without serum during the previous year; (2) with slight exception 40-60 c.c. of serum were sufficient to kill within 6 to 24 hours the spirochætes in the circulating blood, tested by injecting a sample into a guinea-pig; (3) immune bodies in the patient's blood reached their full development on the average two days earlier in serum-treated cases than in others; (4) in fatal serum-treated cases the spirochætes were less abundant than in untreated cases and showed distinct signs of degeneration; (5) no definite effect on fever, jaundice, or haemorrhagic tendency was noted in the serum-treated cases. The authors

make no comment on these results except to suggest that Weil's disease, although a spirochaetal infection, offers a suitable field for serum treatment, inasmuch as true relapse never occurs, immune bodies develop in the blood in the course of the disease, and this serum immunity, when it has developed, persists long after recovery, in one case up to eight years. Both their results and the proper reserve of their conclusions merit attention.

#### CLIMATE AND HEALTH.

IN the recent Gresham Lectures on Physic, which, in the absence of Colonel F. M. Sandwith, A.M.S., in Egypt, have been delivered by Dr. Harry Campbell, the lecturer chose as his subject the Influences of Climate on Health. He pointed out that each race and sub-race tends by natural selection to become adapted to the particular region of the earth which it has inhabited through numerous generations, so that, speaking broadly, the climate in which any given individual thrives best is that to which his ancestors have been long accustomed. Man has spread more widely over the earth than any other creature and is able to thrive under the most varied climatic conditions—tropical, Arctic, temperate, mountainous, marine, and the rest—but this, though true of the human race at large, is not true of the individual human. Although he exhibits greater climatic adaptability than any other animal, his power in this respect is nevertheless limited; the negro, for instance, cannot thrive in the Arctic zone any more than the Esquimo can in the tropical zone, the fact being that the various races of mankind—black, white, yellow, and their subdivisions—have by a long process of natural selection become adapted to their own special regions. If a race migrates far north or south of its native zone it tends to die out, and can only become adapted to the new zone by a process of gradual evolution. From this we are asked to believe that the fear entertained by some nations of a black or a yellow domination is groundless, since the various races are, from the nature of things, compelled to remain within definite confines. We must further conclude that in the gradual process of time definite types will evolve in Australia, New Zealand, and other of our colonies, as well as in the United States of America. This influence of climate in evolving racial types is of profound interest. The blonde race, as Dr. Woodruff has forcibly argued, had its origin in the cold, cloudy north-west region of Europe, where a plentiful supply of cutaneous pigment is not necessary in order to protect the body from the actinic rays of the sun, and where a white skin acts beneficially by favouring the retention of the body-heat, on the same principle that a bright teapot retains the heat longer than a black kettle. This fair race having evolved under the most rigorous conditions, of all races displays the most energetic disposition. It is, indeed, the dominating race of the world. Successive swarms of blondes have for thousands of years past migrated southwards and eastwards, and took a large part in founding the civilisations of Greece and Rome, as well as of Egypt and India. Owing, however, to their inability to survive in a latitude far south of their native zone they have gradually been eliminated and thus left no descendants. Dr.

Campbell adduced the remarkable fact, as showing the dominating influence of the blonde type, that all the Presidents of the United States of America have had blue eyes, and stated the same to be true of the leading generals in the present war—French, Haig, Joffre, Hindenburg, and Mackensen. The great Napoleon, though a Corsican, had grey eyes. Nothing better shows the influence of climate on racial type than the fact that in all countries the complexion darkens with diminution of latitude. Even after so short a period as 13 generations the inhabitants of the Southern States of America are darker than those of the Northern States. In process of time the blonde type will die out in the United States. We are apt to forget that the most northern of them are south of Penzance. Such considerations emphasise the truth that the climate of our ancestors is the one to which we are racially adapted—the one in which we are most likely to enjoy the best health. This principle applies not only to large sections of mankind but even, it may be, to small sections, such as the inhabitants of the various countries of the British Isles. Dr. J. S. Mackintosh has recently insisted upon this point,<sup>1</sup> urging that due regard should be paid to it in any scheme for settling soldiers on the land after the war.

#### HISTOLOGICAL CHANGES IN THE SPINAL CORD FOLLOWING BULLET WOUNDS.

Dr. Aubrey Mussen, assistant in psychiatry, Johns Hopkins Hospital, acting neuropathologist under the Medical Research Committee, London, has published in the October number of the *Review of Neurology and Psychiatry* the results of an investigation into the finer histological changes produced in the cord by direct injury or by concussion of the vertebral column. His material comprised bullet injuries of the brain, with secondary effects on the spinal cord; bullet wounds involving the cord directly; and bullets imbedded in the body of a vertebra without direct injury to the spinal medulla. In a case where the patient lived ten hours after a frontal lobe injury from a hand grenade, there was distinct evidence in certain areas of the spinal cord of bends, twists, and swellings on the axis-cylinders. In a second case, the duration of life after a transverse lesion of the cord at the first dorsal segment being 24 hours, axis-cylinders in the cord showed twists, kinks, and loop formations, and often short, sharp waves, as though from the shock of the concussion. Dr. Mussen has a series of four cases where death occurred 10, 24, 48, and 60 hours respectively after the injury, from an examination of which it is certain that marked degeneration has set in, even in the earliest. These are direct or traumatic degenerations, and are not comparable to what are usually termed secondary degenerations. It is rare to get the opportunity of examining such cases in civil life, and when they are seen, only ordinary secondary degenerations are found, as a rule. But in injuries due to bullet wounds the concussion caused by the impact of the bullet, which at 200 yards would strike a terrific blow in 1/50,000th of a second, produces a commotio the effects of which are transmitted through the dura to the spinal fluid, ligaments, pia mater, and septa into the cord substance, hence lacerations, haemorrhages, and injuries to the neurones, and this, too, in regions many segments removed

from the seat of the injury. Dr. Mussen quotes an interesting letter from the Shooting Editor of the *Field*, in regard to the striking force of the .303 Mark VII. service bullet, weighing 174 grains. At 200 yards its velocity is 2020 feet per second, and its striking energy 1010 foot pounds. Assuming that such a bullet striking the body at that distance is pulled up in three inches by the skin, muscles and spinal column, the resistance offered by the tissues is something like 4000 pounds. This may be regarded as the static pressure of the bullet acting against the tissues. The impact of such a force must produce tremendous disturbances, especially since its shock effects can be transmitted to the spinal fluid, where they set up a hydraulic force which acts radially. Dr. Mussen remarks it would be of value to examine the cord in cases of sudden death from concussion produced by the explosion of a shell without any direct injury whatever. It would appear not improbable that another form of concussion might produce similar disturbances to those so minutely detailed in this useful communication.

#### ROYAL BRITISH COLLEGE OF NURSING.

THE recent amalgamation of the College of Nursing (Limited) with the Royal British Nurses' Association (Incorporated) is a further stage in the public support accorded to the College. The proposal to found such a College was first publicly made by the Hon. Arthur Stanley, chairman of the Joint Red Cross War Committee, in the form of a letter sent to the heads of hospitals and nursing institutions, with the avowed object of organising the teaching and examining of candidates for the nursing profession. Guiltless in intention, the proposal did not, owing to its manner of presentation, meet with immediate approval by the Central Committee for the State Registration of Nurses, which has for many years past worked unremittingly to further Parliamentary action in the interests of the nursing profession, and with which were affiliated the principal nursing associations of Great Britain and Ireland. Towards the end of last year, however, a series of conferences was arranged between the College and the Central Committee, and, after a large measure of unity had been found, negotiations were finally broken off by the Central Committee owing to certain clauses in the proposed Nurses Registration Bill not being accepted by the College. But in the meantime the membership of the College steadily increased by the enrolment of individual members of nursing associations affiliated to the Central Committee, and, finally, the Scottish Nurses' Association threw in its lot definitely with the College of Nursing, whilst retaining the management of its own affairs by a Scottish Board. The affiliated society with the largest membership is the Royal British Nurses' Association, which has now amalgamated with the College. On the granting of the supplementary charter, for which application has been made, the College of Nursing will be wound up in favour of a new Royal British College of Nursing.

#### JUVENILE DELINQUENCY.<sup>1</sup>

JUVENILE lawlessness, it is stated in "The Child and the War,"<sup>1</sup> issued under the auspices of the Howard Association, has spread through the

<sup>1</sup> The Child and the War: being Notes on Juvenile Delinquency. By Cecil Leaon. Published for the Howard Association by P. S. King and Son, London. Price 1s. net.

country like a plague, and although exact statistics are not yet available, there is already sufficient evidence to show that, taking the large towns as a whole, an increase of over 50 per cent. in cases of larceny by quite young persons has occurred, while charges for assault, wilful damage, and gambling are much more numerous. The environment of the present-day child is abnormal. The lack of parental control owing to the exigencies of war, the darkened streets affording opportunities for lawlessness, the mental atmosphere coloured by martial passions: these are all factors inimical to the welfare of the child, and, as the pamphlet points out, punishment, whatever form it may take, affords no real remedy for the evil. The healthy child possesses an unbounded vitality which must have an outlet, and its deeply rooted instincts need guidance and diversion into proper channels. The Howard Association advises the appointment in every district of a children's joint committee composed of members of the local council and magistracy, with powers to co-opt ministers of religion and other social workers. The idea is an admirable one. The Association suggests, further, the enlargement of the sphere of the probation officer and the cooperation with him of carefully selected women of good education. Adequate play-centres are a necessity if the delinquency problem is to be dealt with in a practical manner, and we are glad to know that the Board of Education proposes to give grants for this purpose. Last summer the Board sanctioned the employment in agriculture of nearly 15,000 boys and girls of school age, roughly, half of them between 13 and 14 years old and the remainder between 11 and 13. Such an outlet for superabundant childish energy has much to commend it at the present time. Unfortunately it leaves untouched the long winter evenings, which are the chief difficulty.

Dr. Edward Coey Bigger, Medical Commissioner of the Local Government Board for Ireland, has been nominated by the King a member of the General Council of Medical Education and Registration of the United Kingdom for Ireland.

#### THE LANCET, VOL. II., 1916 : THE INDEX.

OWING to the continued shortage in the paper-supply the Index and Title-page to the volume of THE LANCET which was completed with the issue of Dec. 30th, 1916, have been printed separately, and copies have been supplied gratis to those subscribers who have, up to Feb. 1st, intimated to us their wish to receive them. Other subscribers will be similarly supplied, so long as the stock remains unexhausted, on application to the Manager, THE LANCET Office, 423, Strand, London, W.C. Such applications should be sent in at once.

THE Hawkmoor Sanatorium for the treatment of tuberculosis near Bovey Tracey, erected at a cost of £14,500 and containing 60 beds, has been formally opened by the Devon county council.

DUBLIN UNIVERSITY ELECTION.—The nomination of candidates for the Parliamentary representation of Dublin University took place on Tuesday last. As already announced, the candidates are Mr. A. W. Samuels, K.C., and Professor Sir Robert H. Woods, M.Ch. Polling began on Wednesday and will continue till next Monday afternoon.

## THE CONTROL OF VENEREAL DISEASES.

### *The City of Aberdeen Scheme.*

Dr. Matthew Hay, medical officer of health of the city of Aberdeen, has sent us the draft of a scheme which has been before his Public Health Committee. The scheme has been drawn up in consultation with the county medical officers of Aberdeen, Banff, and Kincardine, and representatives of the medical profession in Aberdeen and the three counties. The Royal Infirmary of Aberdeen is proposed as the treatment centre, without precluding the provision of facilities elsewhere later. Cases in the later stages are to be treated as heretofore in the ordinary wards, and the existing provision of special wards to be extended to about 20 beds. For the out-patient treatment of early and more infectious cases special clinics are proposed, or mixed clinics in association with cases of skin disease, to be held on at least two days and two evenings in the week for both sexes separately. The special medical staff is to include a surgeon and a physician, who will form part of the infirmary staff, the appointments to be provisional during the war. After the close of the war these special officers will be allowed to engage in consulting but not general practice. A junior medical assistant will assist the special staff in the venereal wards and clinics, and also be at the disposal of medical practitioners to advise them in home treatment. The bacteriological services required under the scheme are to be given in the laboratories attached to the infirmary under the general supervision of the chief pathologist. If the approval of the Local Government Board is obtained fees are to be offered to the medical practitioner for procuring blood for Wassermann test (5s) and samples of secretion (2s. 6d). The question of the payment of general practitioners for treatment of venereal diseases in private practice is to be held over at present. But nothing is understood to stand in the way of the practitioner being remunerated as usual by patients able and willing to pay for treatment, and in such cases laboratory tests will still be made gratis and possibly salvarsan supplied. Finally, the University is to be asked to take steps to ensure the practical instruction of all medical students in the diagnosis and treatment of venereal diseases.

### *The City of London Scheme: The Position of the General Practitioner.*

In his address last week to the British Hospitals Association on the treatment and control of venereal diseases, with special reference to the voluntary hospital, Dr. W. J. Howarth dwelt in some detail on the scheme for the City of London drawn up by himself as medical officer of health. As we have already stated, an existing hospital in Golden-lane is to be used as the treatment centre, beds being provided there for ordinary routine work. For cases requiring special treatment arrangements will be made for the use of beds at St. Bartholomew's Hospital. The clinic will be provided with waiting-rooms, consultation-room, dispensary, two wards, two operating or special treatment rooms, and a teaching and demonstration-room. Special laboratory work will be carried out under the direction of the hospital pathologist and routine clinical examinations at the centre itself. Residential accommodation for the staff is attached. The whole centre will be under the direct administration of the hospital authorities. The staff, in addition to the nurses and general helpers, will include a member of the honorary staff, who will be in charge, assisted by a whole-time non-resident officer and a resident medical officer who will divide his time between the work of the skin department and that devoted to the treatment of venereal diseases. Assistance by general practitioners is under consideration. Provision is being made for free bacteriological examination of morbid products, the free supply of salvarsan, and for educational and publicity work. The Corporation have suggested as payment a maximum sum of £1800 for the first year, exclusive of the cost of salvarsan or its substitutes. The capital expenditure necessary for the equipment and alterations, estimated at about £1000, will be borne by the Corporation. Dr. Howarth states that quite apart from the City scheme arrangements already have been made at St. Bartholomew's Hospital for putting into practice the early preventive treatment described in our leading article of Jan. 13th. The facilities are only used by soldiers.

Dr. Howarth went on to define the position of the general practitioner to the venereal schemes.

"I do not think," he said, "that hospitals are going to attract patients on a higher social scale for this special treatment than they do to-day for other treatment. Possibly, even some of those who attend for free treatment of other diseases, and who could pay their own doctor—there are such attend hospital out-patients' departments—will not seek free treatment for venereal infection. This section of the community will consult their own doctors, if they seek medical advice at all. I express a doubt here, because I fear that the quack, if allowed to flourish, will maintain his position as an active competitor. This should not be, and the hospitals, whilst accepting responsibility for imparting knowledge to practitioners, must assist him to obtain his rightful position by joining in the present agitation in favour of suppressing unqualified treatment and quack advertisements. The interest of the practitioners must be active and not passive. There is too much of the passive tendency in the latest introductions, in which treatment is undertaken at the instance of local authorities. This must inevitably result if special places are established with clinical responsibility limited to a public officer and inadequate encouragement given to the local practitioners. It is an undoubted necessity that medical practitioners shall be actively interested in all public medical work. Where hospitals exist evry opportunity should be taken to extend the sphere of usefulness. The establishment of new centres, unless circumstances require it, is a source of weakness, and coincidently with this increased activity the duty of the hospital to the public must not be lost sight of. This duty is closely associated with continuous educational facilities for the medical profession as a whole."

### *Deputation on Unqualified Practice.*

Lord Rhondda, President of the Local Government Board, received on Jan. 24th a deputation urging that unqualified practitioners should be prevented from undertaking the treatment of venereal diseases. The Royal College of Physicians of London, the British Medical Association, and the National Council for Combating Venereal Diseases were represented, as well as the associations of local authorities. The deputation was introduced by Sir Hamar Greenwood, M.P. The Lord Mayor of Birmingham, speaking on behalf of the Association of Municipal Corporations, said that public money should only be spent where there was prospect of the best results, and in order to protect the work of the local authorities quack advertisements should be suppressed and unqualified persons prevented from treating cases. Dr. Frederick Taylor, on behalf of the Royal College of Physicians, said that venereal diseases ought to be treated by those who knew how to do so. Mr. E. B. Turner, speaking as chairman of representative meetings of the British Medical Association, said that the Association had passed strong resolutions on the subject. The medical profession, in seeking to ensure efficient means of treating venereal diseases, was working for the general good of the community. Sir Malcolm Morris expressed the hope that a Bill suppressing quack treatment would be introduced. Lord Rhondda, in reply, said that his department fully realised the burning nature of the question of unqualified practice. He looked upon it as one of the most urgent and important questions to be dealt with in the near future. He had been greatly impressed with the complete agreement on this subject between local authorities and the medical profession, and assured the deputation that legislation would probably be brought in by one of the State departments—probably the Local Government Board—at an early date. Replying later to a vote of thanks, Lord Rhondda added that he was perfectly satisfied that the medical profession were actuated in this question by considerations of State policy and not by self-interest.

### *Sickness Benefit and the Friendly Societies.*

In its final report issued last week on Approved Society finance and administration in connexion with National Health Insurance the Departmental Committee recommends societies to alter their rules so as to enable them to pay benefits in sickness due to venereal diseases, basing its recommendation on the danger to the community of the venereal patient.

### *Supply of Salvarsan without Formalities.*

A recent Order issued under the Defence of the Realm Acts facilitates the distribution of salvarsan and its approved substitutes. During the war the Local Government Board may authorise any local authority or person to

buy and distribute "any drug, medicine, or medicinal preparation specially designed for the treatment of venereal diseases" without incurring any liability to proceedings "in respect of the importation, purchase, sale, distribution, or use thereof on the ground that any patent or other similar rights are infringed."

## Public Health.

### REPORTS OF SCHOOL MEDICAL OFFICERS.

*Bristol* ranks sixth among the cities of England and Wales in regard to population, after the metropolis, and has a school roll of 59,372. The report of 1915 is furnished by Dr. Madeleine Baker, in the absence of Dr. R. A. Askins on military service. The number of children examined as entrants, leavers, and in the intermediate group was 15,088. The state of nutrition was found to be "normal" in 83·2, and excellent in 13·3 per cent., only 3·46 per cent. being considered to be below normal, and of these only 0·17 to be actually badly nourished. The cleanliness of the children was also very satisfactory, 98·8 per cent. being returned as clean, and only 0·05 per cent. being found to have body vermin. The children's eyesight was found to be perfect in each eye in 47·5 per cent. of those examined, while an additional 40 per cent. possessed at least 6/9 of normal vision in either right or left eye. Organic heart disease was diagnosed in 1·31 per cent., being considerably more prevalent among girls (2·17 per cent.) than boys (1·04 per cent.) at the leaving age. Tuberculosis of the lungs was found in 0·12 and suspected in 0·55 per cent. of the children; other forms of the disease (glandular and articular) were found in 0·20 per cent. Two school clinics were opened in June, 1915, one in New-street and the other in Bedminster-parade. These clinics are used for the two purposes of inspection and treatment. Inspection clinics are also held at New-street special school and at the Bedminster school for mothers. The treatment clinics deal with children that would otherwise obtain no treatment, especially in regard to affections of the skin, eye and ear. Notifiable infectious diseases were much less prevalent during 1915 than in the previous year, 795 cases as compared with 1745 in 1914, scarlet fever (553 cases) and diphtheria (228) being the most important. Non-notifiable infections were, on the other hand, more prevalent, measles being the chief. No school closure for epidemic disease was required, except for a fortnight in a single school. The chief cause of death among school children was tuberculous disease (46 fatal cases), either of the lungs, the meninges, or in other situations. Pneumonia caused 26 deaths, organic heart disease 18, diphtheria and croup 14, and meningitis (non-tuberculous) 14. Two open-air schools have been at work throughout the year, the larger one at Knowle, with an average attendance of 69, and a smaller one at Barton Hill; anaemia, malnutrition and general delicacy, and tuberculosis contacts have been the cases chiefly treated, and the effects have been most beneficial. The children take a keen interest in gardening, have the advantage of walks in the country, and are ensured a midday rest, as well as the use of a shower-bath.

At *Cardiff* the average school attendance during 1915 was 27,982; the number of children examined in the entrant and leaver groups was 5936. The report is furnished by Dr. Edward Walford, medical officer of health for the city and port. The state of nutrition was found to be normal in 73·1 and excellent in 13·9 per cent.; in 12·7 per cent. it was below normal, and among these in 1·3 per cent. it was classed as distinctly bad. The body cleanliness was satisfactory in 94·7 per cent.; in 2·3 per cent. vermin were found to be present. The eyesight was examined in 2918 children of the "leaver" age (12 to 14 years); it was found to be perfect in each eye in 52·9 per cent., and an additional 16 per cent. possessed 6/6 in either right or left eye. Organic disease of the heart was found to be present in 0·72 per cent.; amongst boys the incidence was 0·91 and amongst girls it was 0·52 per cent. Tuberculosis of the lungs was found in 0·06 and suspected in 0·30 per cent., and in a further 0·2 per cent. non-pulmonary tuberculosis was diagnosed. A school clinic has been in operation since 1913 in the basement of the City Hall, where defects of

the ear, nose, and throat are treated, and examinations made for defective vision.

In Mr. Joseph Beard's report on *Carlisle* schools special attention is drawn to the erection of a new infants' school at Newtown, which "marks a great advance in the hygienic construction of elementary schools." Classroom accommodation for 400 is provided on a basis of nine square feet per head, with verandahs for teaching and a central play-room in addition. All class-rooms have windows on two sides at least carried up to the ceiling; the corridor windows are removable, so that in summer the corridors may be entirely open to the air. Heating is on the low-pressure hot-water system, the pipes being placed on the north side of the class-rooms and at a high level so as to obviate down draughts. The medical examination has included 2675 entrants, leavers, and 8-year-old children. Their nutrition was found to be normal in 69·3 per cent. and excellent in 12·4 per cent.; in 18·2 per cent. it was below normal, but in only 0·1 per cent. was it considered to be actually bad. Cleanliness of the body was satisfactory in 86·8 per cent., and only 0·6 per cent. were considered to be actually dirty, though 1·3 per cent. in addition were verminous and 3·0 per cent. flea-bitten. Perfect vision was possessed by 68·8 per cent. of the children of "leaver" age. Of the children in the leaver and intermediate groups 97 per cent. had perfect hearing, as shown by the whisper at 20 feet. Organic heart disease was found in 1·3 per cent. of the total number of children, being nearly twice as frequent among boys as among girls. This disparity resulted entirely from the preponderance in boy entrants (503), in 11 of whom organic heart disease was diagnosed, while in a nearly equal number of girls (483) only one such case was found. Tuberculosis of the lungs was found in 1·3 and suspected in 8·4 per cent.; other forms of tubercle were diagnosed in an additional 1 per cent.

Dr. W. G. Willoughby, in presenting the report to the education authority of *Eastbourne*, states that Dr. Norah Smith has been practically school medical officer during the year 1915 on account of his own service in the Army, and draws attention to the fact that there is again a decrease in the number of children attending the elementary schools, due to the rapidly diminishing birth-rate; in five years this decrease has amounted to 153. The total number of children inspected at the routine age-periods (entrants, intermediates, and leavers) was 1902. Of these, 25·5 per cent. were found to be in an excellent condition as regards nutrition, 52·3 were normal, and 22·2 below normal, 8·3 being actually badly nourished. As regards cleanliness, 89·3 are returned as clean, only 1·5 per cent. being considered to be dirty; in addition pediculosis was found in 1·2 per cent., and 8·1 per cent. are returned as "P.I." The vision was perfect in each eye in 80·9 per cent. of the leavers and intermediate group. Organic disease of the heart was diagnosed in 0·9 per cent., being much more prevalent amongst girls (1·31) than boys (0·51 per cent.). Tuberculosis of the lungs was found in 0·1 and suspected in 0·2 per cent. of the children examined. Non-pulmonary tuberculosis (glandular) was found in an additional 0·3 per cent. A clinic has been established for minor ailments (chiefly ear, eye, and skin defects), where the children attend each whole school day at 10 A.M. It had been found that their attendance at intervals and the issue of ointment, lotion, &c., for use at home was unsatisfactory, as the parents did not follow the instructions given.

The report on school medical inspection at *Newark* for 1915 is a short one, as Dr. S. Nicol Galbraith was appointed only at the beginning of November, there having been an interim without a school medical officer since May 31st, when Dr. E. A. B. Poole ceased to act. The number of children examined at the routine ages was 510; of these, 30 per cent. were "excellent" as regards nutrition, 14·5 were regarded as below normal, only 0·8 per cent. (4 children) as actually badly nourished, and the rest were classed as normal. Cleanliness was quite satisfactory in 97·5 per cent. Vision was perfect in each eye in 81·5 per cent. of the leavers and children of intermediate age; in only 8·6 per cent. was visual acuity less than 6/9 of the normal. Organic heart disease was diagnosed in 1·17 per cent. (4 girls and 2 boys), and tuberculosis (glandular) was diagnosed in 2 children and suspected (pulmonary) in 5 others.

In the report on school hygiene at *Warrington* Dr. G. W. N. Joseph draws attention to the fact (perhaps not always fully

realised) that "whatever the necessity for carrying on the work of the School Medical Service was in the days before the war, the present abnormal conditions greatly intensify it.....It is more than ever essential that a generation of healthy children should be growing up." This is seen on examining the statistics of the causes for rejection of recruits, many of the defects being preventable or remediable if taken in time. The total number of children examined in the code groups was 3786: an almost equal number (3655) were inspected at the school clinic, being "special" cases, chiefly of impetigo, ringworm, pediculosis, and conjunctivitis and blepharitis. Of the code-group children the nutrition was considered to be above normal in 7·6, and normal in 83·7 per cent., only 8·6 per cent. being below normal and 0·2 per cent. markedly defective. Cleanliness both of the body and head was satisfactory in 99·8 per cent. In the intermediate and leaver groups 33·7 per cent. had perfect vision, and 31·5 per cent. had V. = 6/9 in each eye. Children able to read 6/12 are not dealt with unless there are other symptoms of visual defect; if only 6/18 can be read, the parents are asked to consult their doctor, but the matter is not pressed further; if there is any difficulty in reading 6/18 the parents are pressed, as far as it is possible, to obtain treatment. This procedure is more indulgent to the shortsighted than the usual practice. Organic disease of the heart was found in only 6 children (0·1 per cent.), 5 of whom were girls. Tuberculosis of the lungs was diagnosed in only one child and suspected in another; other forms of the disease (joints, glands, &c.) were found in five children. The work of the treatment clinic has increased enormously, the number of children dealt with having been nearly double, and the number of attendances more than double, the corresponding figures for 1914. Pediculosis of the scalp does not now receive treatment at the clinic. This was found to encourage laziness in the parent, to take up too much time, and to be a bad example to the other children. The proper procedure is explained to the parent by the school nurse (vinegar and water and a fine-tooth comb), and if rapid improvement does not follow it is advised that the hair be cut short. The great cause of failure is the use of too cheap, and therefore too coarse, a comb. Dr. Joseph notes that there is still a prevalent belief that "nits in the hair are a sign of good health in the child."

In the city of York the total number of children in the entrant and leaver groups inspected amounted to 1586; none of the "intermediate" age were examined. The nutrition was found to be normal in 73·5 and excellent in 14·8 per cent.; 11·7 per cent. were below normal, but none were actually badly nourished. Cleanliness of the body was satisfactory in 89·5 per cent., the remaining 10·5 being dirty, but in only 0·3 per cent. were pediculi found. The vision (of the elder children) was perfect in each eye in 46·9 per cent.; in 35·3 per cent. there was "less than 6/6, but not less than 6/9 in one or both eyes"; (presumably less than 6/6 in one or both, but not less than 6/9 in each eye); in 17·8 per cent. there was less than 6/9 "in one or both eyes." Perfect hearing was possessed by 97·8 per cent. of the children. Organic heart disease was found in 20 children (1·2 per cent.), of whom 6 were boys and 14 were girls. Tuberculosis of the lungs was not diagnosed in a single instance, and in only three children was it suspected; non-pulmonary tuberculosis was found in two children only—these are the figures given in Table II. referring to the age-group children examined. There were, however, 53 cases of tuberculosis notified during the year among children of from 5 to 15 years of age, 20 being pulmonary and 33 glandular, articular, &c.; this equals 0·45 per cent. of the school population. Dr. E. M. Smith's report is followed by a valuable study of the condition of the teeth in 10,000 York children by Mr. T. E. Constant, dental surgeon to the York clinic.

#### URBAN VITAL STATISTICS.

(Week ended Jan. 27th, 1917.)

**English and Welsh Towns.**—In the 96 English and Welsh towns, with an aggregate population estimated at nearly 18,000,000 persons, the annual rate of mortality during the week was equal to 17·0, against rates steadily declining from 23·7 to 16·2 per 1000 in the five preceding weeks. In London, with a population of more than 4,000,000, the death-rate was 18·4, or 1·9 per 1000 above that in the previous week; while among the remaining towns it ranged from 6·0 in Enfield, 8·1 in Acton, and 8·7 in Haling, to 24·3 in St. Helens, 26·0 in Ipswich, and 28·2 in Bournemouth. The principal epidemic diseases caused 193 deaths, corresponding to an annual rate of 0·6 per 1000, and included 70 from measles, 53 from infantile diarrhoea, 38 from diphtheria, 18 from

whooping-cough, 8 from scarlet fever, and 6 from enteric fever. The deaths from measles were slightly in excess of the average in the three preceding weeks, and caused a death-rate of 1·5 in East Ham and of 3·7 in Wimbleton. The 81 cases of scarlet fever under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were 1 less, and the 1390 cases of diphtheria were 6 less than at the end of the previous week. Of the 5636 deaths from all causes in the 96 towns, 230 resulted from violence; the causes of 62 of the total deaths were uncertified, of which 10 were registered in Birmingham, 10 in Liverpool, and 5 in South Shields, but only 1 in London.

**Scotch Towns.**—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death-rate was equal to 16·9, against rates declining from 19·6 to 17·6 per 1000 in the five preceding weeks. The 356 deaths registered in Glasgow corresponded to an annual rate of 16·6, were equal to the number recorded in the previous week, and included 6 from whooping-cough, 5 each from measles and diphtheria, and 1 each from scarlet fever and infantile diarrhoea. In Edinburgh the 103 deaths were equal to an annual rate of 16·2 per 1000, and included a fatal case of whooping-cough and 1 of diphtheria.

**Irish Towns.**—The 174 deaths in Dublin were equal to an annual rate of 22·7, or 1·7 per 1000 below that recorded in the previous week, and included 3 each from measles and infantile diarrhoea and 1 each from whooping-cough and diphtheria. The causes of 8 of the total deaths were uncertified. In Belfast 189 deaths were registered during the week, and corresponded to an annual rate of 22·4, or 2·9 per 1000 above the rate recorded in the previous week; 3 deaths were referred to measles, 3 to infantile diarrhoea, and 1 to whooping-cough.

#### THE SERVICES.

##### ROYAL NAVAL MEDICAL SERVICE.

To be temporary Surgeons: E. S. Orme, G. Hoffmeister, A. F. Grimby.

##### ARMY MEDICAL SERVICE.

Lieutenant-Colonels to be acting Colonels whilst employed as Assistant Directors of Medical Services of a Division: G. W. Tate, F. E. Gunter.

##### ROYAL ARMY MEDICAL CORPS.

Lieut.-Col. E. Brodribb is placed on the half-pay list on account of ill-health.

Majors (acting Lieutenant-Colonels) relinquishing their acting rank on reposing: W. J. P. Adye-Curran, A. S. Arthur.

Major D. O. Hyde, D.S.O., to be acting Lieutenant-Colonel whilst in command of Field Ambulance.

Major T. P. Bradley, Canadian A.M.C. (Canadian Militia), to be temporary Major.

To be temporary Captains: F. H. Knaggs (whilst employed at the Huddersfield War Hospital), Temp. Lieut. E. P. Evans, J. L. Aymard, P. S. Blaker (late Capt. I.M.S.) H. Dodgson, L. M. Scott, C. R. Skyrme (late Surg.-Capt. R.G.A. (Vol.)).

Captains, from R.A.M.C. Special Reserve, to be Lieutenants, and granted the rank of temporary Captain: W. L. E. Reynolds, H. R. Sheppard.

To be temporary Lieutenants: D. N. Knox, T. Y. Finlay, J. H. Kay, J. C. Henderson, E. Miskin, M. R. Lawrence, Temp. Hon. Capt. H. Deardon, J. Dunton, C. C. Gibson, B. H. Woodyatt, T. J. Taunton, A. E. Woodall, A. Y. Hutchinson, J. Gardner, E. O'Reilly, T. E. Regan, J. D. Laird, T. Burrell, W. E. Barrett, D. A. H. Moses, A. C. Parsons, F. B. Elwood, J. G. Heath, J. R. O'Brien, R. L. Rea, W. F. H. Ives, A. P. Thom, E. C. B. Ibstock, J. W. Lindsay, J. Hogg, J. B. Howell, J. S. Doyle, R. L. Jones, R. Roberts, A. M. Crawford, T. J. McDonald, W. T. Hardie, T. H. Campbell, J. F. Wood, F. C. Stewart, J. Harper, R. E. Sedgwick, G. R. New, N. Flower, R. G. Cunningham, W. M. McFarlane, A. F. W. Millar, A. G. Holmes, W. A. Murray.

To be temporary Honorary Lieutenant: N. Sherrard.

Officers relinquishing their commissions: Temp. Major P. MacGregor (on account of ill-health), Temp. Hon. Major T. C. L. Jones (having ceased to be employed with No. 6 British Red Cross (Liverpool Merchants' Mobile) Hospital), Temp. Capts. A. H. Lyster, C. H. Shearman, S. H. Ormond, O. H. Edwards, J. E. Stacey (on account of ill-health), Temp. Lieuts. W. Thomson (on account of ill-health), H. A. Hutt, P. W. Barker, R. T. Jupp (on account of ill-health).

##### SPECIAL RESERVE OF OFFICERS.

Capt. (temp. Major) R. M. Beath relinquishes his temporary rank on ceasing to command Troops on a Hospital Ship.

To be Captains: W. S. Dawson, G. Perkins, J. N. L. Blamey, R. L. Newell.

To be Lieutenants: W. Garde-Browne, E. Hollott Creed (from University of London Contingent, O.T.C.).

##### TERRITORIAL FORCE.

To be Captains: Capt. A. Rodger (from a Mounted Brigade Field Ambulance), Capt. H. E. S. Richards (from Attached to Units other than Medical Units), Lieut. E. B. C. Mayrs, Lieut. W. F. Lanchester, Lieut. T. Higson, Lieut. A. Iredale.

To be Lieutenant: J. D. Davidson.

##### TERRITORIAL FORCE RESERVE.

To be Captain: Capt. F. G. Bennett, from a Field Ambulance.

**HART HOUSE V.A.D. HOSPITAL, BURNHAM, SOMERSET.**—A new wing and other additions have been added to this hospital and the accommodation increased by 50 beds. The institution now contains 120 beds.

**HOSPITAL SUNDAY AT PLYMOUTH.**—The South Devon and East Cornwall Hospital has received £562 as the result of the observance of Oct. 2nd, 1916, as Hospital Sunday at Plymouth.

## Correspondence.

*"Audi alteram partem."*

### THE PHENOMENA OF ANAPHYLAXIS.

*To the Editor of THE LANCET.*

SIR.—In connexion with Captain S. Wyard's paper in your issue of Jan. 20th, and the references to the same subject in your leading article, the following cases seem worth recording. They appear hard to reconcile with many of our present ideas concerning the mechanism of anaphylaxis, especially as regards the minimal toxicogenic dose and the desensitising effect of subminimal doses of antigen, recorded by Besredka, and advocated by him as affording efficient protection when administering antisera to patients suspected of previous sensitisation.

For certain reasons, which have no bearing on the point in question, the effect was tried of administering repeated small doses of antistreptococcal serum in a series of cases of streptococcal infections of varying acuteness. In some few cases an autogenous vaccine was administered concurrently with the serum. In the majority of these latter cases serum and vaccine were administered at the same time, sometimes separately and at different sites, in some cases together. When given together the serum and vaccine were mixed in the syringe immediately before injection. In all, some 28 cases were treated on these lines, and of these four developed acute anaphylactic symptoms. In one case two separate attacks were precipitated.

The essential details are as follows:—

CASE 1.—Severe streptococcal infection, originating in a traumatic injury to the wrist, with subsequent metastatic abscesses in the leg.

#### *Injections of Serum and Vaccine.*

	Antistrepto-coccal serum.	Antistrepto-coccal serum	Vaccine.
9/3/16 A.M. ...	2 c.c.	21 3/16 ... 2 c.c. ...	—
P.M. ...	2 c.c.	22 3/16 ... 2 c.c. ...	—
10/3/16 A.M. ...	2 c.c.	23 3/16 ... 2 c.c. ...	+ 10 mil. strepto-
P.M. ...	1 1/2 c.c.	25 3/14 ... 2 c.c. ...	+ 20 mil. occcl.
11/3/16 ...	2 c.c.	27 3/16 ... 0 25 c.c. ...	+ 25 mil. "
12/3/16 ...	2 c.c.	29 4/16 ... 0 2 c.c. ...	+ 25 mil. "
14/3/16 ...	2 c.c.	31 3/16 ... 0 5 c.c. ...	+ 40 mil. "
15/3/16 ...	2 c.c.	3 4/16 ... 0 5 c.c. ...	+ 50 mil. "
16/3/16 ...	2 c.c.	5 4/16 ... 0 5 c.c. ...	+ 100 mil. "
17/3/16 ...	1 c.c.	7 4/16 ... 0 6 c.c. ...	+ 200 mil. "
20/3/16 ...	2 c.c.	10 4/16 ... 1 5 c.c. ...	+ 200 mil. "

(Immediate anaphylaxis.)

In addition to these injections of serum the wound in the hand, and later the two small cavities in the leg, were dressed daily with diluted antistreptococcal serum (1/10 in normal saline), about 10 c.c. of the saline dilution being used at each dressing. On 14/3/16, and on most succeeding days 1 to 2 c.c. of pure serum was applied to the wound before the fresh dressing was put on. On no occasion were more than 6 c.c. of serum given in one day, including the actual injection and the amount used as a dressing for the wounds, and on the great majority of days the total amount varied between 2 and 4 c.c. The majority of the injections, including that which was followed by the anaphylactic attack, were given subcutaneously; a few were administered intramuscularly, none intravenously. No history could be obtained of any previous injection of serum.

CASE 2.—Streptococcal infection of wounds of leg.

#### *Injections of Serum.*

	Antistrepto-coccal serum.	Antistrepto-coccal serum.
18/7/16 ...	... 2 c.c.	22 7/16 ... ... ... 2 c.c.
19/7/16 ...	... 2 c.c.	22 7/16 ... ... ... 2 c.c.
21/7/16 ...	... 2 c.c.	28 7/16 ... ... ... 1 c.c.

(Immediate anaphylaxis.)

There were two small surface wounds and one long superficial sinus, open at both ends. These were irrigated daily with a 1/10 dilution of serum in saline, about 10 c.c. of the fluid being used on each occasion. All the serum injections were given intramuscularly in the immediate neighbourhood of one of the wounds. The infection in this case originated in a gunshot wound, and there was a probable injection of antitetanic serum about the end of the first week of April, 1916.

CASE 3.—Streptococcal infection of gunshot wound of buttock.

#### *Injections of Serum.*

	Antistrepto-coccal serum.	Antistrepto-coccal serum.
27/7/16 ...	... 2 5 c.c.	31/7/16 ... ... ... 2 5 c.c.
28/7/16 ...	... 2 c.c.	(Immediate anaphylaxis.)

The injections were given intramuscularly in the immediate neighbourhood of the wound. From 17/7/16 to

31/7/16 the wound cavity, which was at first large but rapidly decreased in size, was washed out with 10 c.c. of a 1/10 dilution of serum, as in the above cases. On 18/7/16, 10 c.c. of undiluted serum were injected into the wound cavity, but very little was retained in it, the greater part returning at once. This patient was wounded on July 1st, and received an injection of antitetanic serum before being evacuated to England.

CASE 4.—This was an acute streptococcal infection of the hand and arm, following trauma. The full notes of this case are not available at the present moment, but it was essentially similar to Case 1, with one important exception. Within a few days of admission the patient received three injections, each of 10 c.c., of antistreptococcal serum; these were without effect. He was then treated for three weeks with a streptococcal vaccine, also without effect. Small daily injections of serum were then commenced, combined with intermittent irrigation of the wound with diluted serum as above, and an immediate beneficial result was observed. After about 14 days of this treatment he suddenly had a sharp anaphylactic reaction following the injection of 2 c.c. of serum. This was the first case in which such a reaction occurred, and as it was thought that the patient had probably been desensitised, the injections were continued. About 14 days later another similar reaction occurred and no further serum injections were given. 2 c.c. was the largest amount administered at any one injection, and on several occasions 1 c.c. only was given. The injections were given subcutaneously and intramuscularly.

The symptoms were strikingly similar in all four cases. They started immediately after the injections had been given, in one case before the needle had been withdrawn, and in every case within a few minutes. Difficult and laboured respiration was a marked feature in each case. Marked cyanosis was present in two cases, while in the other two this was replaced by intense congestion and redness of the face, followed by profuse perspiration, which developed rather later in the two cases which showed cyanosis. In all cases pain was complained of: in three instances localised in the back, or back and side, in one in the abdomen. Each patient complained of a feeling of acute distress which he was quite unable to describe. In two of the cases, in which there was only a slight irregularity of temperature at the time of the attack, a slight pyrexial reaction followed, the temperature rising to about 100° F. on the same evening and then rapidly subsiding. The other two cases were suffering from definite pyrexia ranging from 99° to 102° at the time when the anaphylactic reaction occurred. Of these, Case 4 on each occasion showed only a slight exacerbation of fever, while with Case 1 the temperature rose the same night to 105·2, but then rapidly subsided. In each case the acute symptoms lasted for 5 to 15 minutes, but with one exception there was definite discomfort and malaise lasting for some hours. All four patients had completely recovered from the attack by the following morning, and they all subsequently made a complete recovery from their infections. No acute local manifestation occurred with these attacks, but one of the four cases and several of the other 24 treated on these lines exhibited transitory joint pains and urticarial rashes during the course of the infection.

It would seem difficult to offer any satisfactory explanation of these facts. Case 1 had apparently never received a previous and possibly sensitising dose of serum. Of the others, Cases 2 and 3 had received at most a few c.c. of antitetanic serum on one occasion. Case 4 alone had received a previous dose of any size. In this connexion it may be recalled that Holubot, dealing with bacterial anaphylaxis, demonstrated that sensitisation was more surely attained by repeated small doses of antigen than by a single large dose. The very small doses which actually gave rise to the anaphylactic attack are remarkable. The conclusion can, I think, hardly be avoided that we are dealing with a cumulative effect, an idea which is rendered more probable by our knowledge of the persistence of an antigen in the tissues after injection. Adopting this hypothesis, it might be supposed that a delicate state of equilibrium had been established between the antigen and antibody already in the tissues, and that the sudden addition of even a minute excess of the former sufficed to destroy this balance and precipitate the reaction which leads to anaphylactic shock. Such a suggestion is, of course, entirely lacking in satisfactory experimental support and presents certain obvious difficulties, but it is hard to find any explanation which will cover the facts without running contrary to many of the current theories.

The important practical point is that it would seem quite impossible to reconcile these cases with a trust in the

efficient production of desensitisation by a small initial dose of serum. In this connexion, if I recollect aright, Professor Andrewes in a paper on Cerebro-Spinal Meningitis, communicated last year to the Pathological Section of the Royal Society of Medicine, noted that in one case in which an attempt was made to desensitise a patient by a small preliminary injection of antimentingococcal serum, acute anaphylaxis resulted when the subsequent therapeutic dose was administered.—I am, Sir, yours faithfully,

W. W. C. TOPLEY,  
Bacteriological Department, Charing Cross Hospital,  
Jan. 20th, 1917.

To the Editor of THE LANCET.

SIR,—In the papers referring to anaphylaxis which have lately been published, it is a pity that most of the results given in them are in so vague and indefinite a form. Perhaps it is yet too early to expect much else. One would like to see numerical records of the total number of serum-treated cases seen by each observer, the number of cases in which anaphylaxis occurred, the amount of serum, the mode of administration, and the number of doses given. Also records of the severity of the anaphylactic attack, the time of onset, and the duration and the treatment adopted. Only thus will it be possible later to make trustworthy deductions. This is evident because in a few instances where definite figures are given they are obviously inaccurate. For example, in Captain S. Wyard's paper in THE LANCET of Jan. 20th it is stated that about 4-5 c.c. of serum are required to produce an anaphylactic attack in a sensitised guinea pig, and that "antigen administered by the mouth or rectum never produces anaphylactic shock," whereas the truth is that as many minimis given subcutaneously will often suffice in the guinea-pig, and in man I have seen and described a case in which 0.5 c.c. given by the mouth produced slight symptoms on two occasions in a man who had previously nearly died of anaphylaxis. Again, there may be something special about antitetanic serum to justify the assertion of the Committee of the War Office (quoted by Sir D. Bruce) that the danger of anaphylactic shock is negligible with 3 c.c. of horse serum after a preceding injection; but one would very much like to know whether there have not been any anaphylactic accidents as a result, not to mention fatalities. Of course, even if there have been, it does not follow that the risk is not justifiable: but the risk should not be concealed or ignored.

I am, Sir, yours faithfully,  
A. S. LEYTON.  
University of Leeds, Jan. 29th, 1917.

DEFINITION OF ACUTE ALCOHOLISM.

To the Editor of THE LANCET.

SIR,—From Dr. Chalmers Watson's letter in your issue of Jan. 27th it is apparently to be inferred that the records of the Edinburgh Royal Infirmary do not enable a distinction to be made between cases of delirium tremens and other less definite alcoholic conditions. This is unfortunate, and must tend, I fear, to make Dr. Watson's statistics less impressive than they might otherwise be. For it is obvious that an increase in the number of cases of delirium tremens would have an evidential value which cannot possibly attach to an increase in the number of cases of "acute alcoholism"—a category of vague and elastic limits which may quite probably include patients who were merely so "drunk and incapable" that an unusually sympathetic or inexperienced policeman would prefer to take them to the hospital rather than to the cells. And in this connexion it may be recalled that these cases, as Dr. Watson tells us, were "nearly all brought in by the police," and, no doubt, the Edinburgh police, like the police of other towns, have been freely diluted with special constables during the past year. Under these circumstances, it must remain a matter of some uncertainty by what precise criteria we are to distinguish the cases of "acute alcoholism" treated in the Royal Infirmary from the cases of "acute alcoholism" treated in the Edinburgh police stations. No such uncertainty would affect the value of statistics of delirium tremens, and if Dr. Watson were able to give figures showing that the incidence of that disease amongst women had really risen during the last year, the "curious paradox" of which he speaks would undoubtedly merit attention. And this all the more because no parallel for it is apparently to be found

anywhere in the country. In all the areas for which statistics of this kind have been published it has been the invariable rule that the decrease in arrests for drunkenness during the last 12 months has been associated with a decrease in the number of cases of delirium tremens treated in Poor-law institutions and in prisons. Nor is this observation limited to England; thus in Glasgow the number of patients treated for delirium tremens in the Eastern District Hospital and in the Govan Poorhouse during the period from mid-August, 1914, to mid-August, 1915, was 105—84 males and 21 females; while in the following 12 months, i.e., subsequent to the restriction of public-house hours under the Orders of the Central Control Board, the number fell to 70—59 men and 11 women.

Dr. Watson adds that he attaches little importance to the differentiation of delirium tremens, which he regards as "merely an incident in the development of *some* cases of acute alcoholism." This seems a rather surprising statement; at all events, I do not know of a single authoritative writer on alcoholism who does not accept the view that delirium tremens is a disease arising always on a basis of *chronic* alcoholism, and further, that it occupies a quite special and distinct position amongst the alcoholic psychoses. And this is most assuredly the teaching of general clinical experience. It is, in fact, by reason of its clear relation to the chronic intoxication and its comparatively definite and unequivocal clinical characteristics, that delirium tremens is so useful for statistical purposes, especially as an index of forms of intemperance which do not find expression in public drunkenness. Thus, for example, the increase of delirium tremens under the régime of prohibition in Russia is one of the most important evidences of the development of secret drinking and of the use of dangerous substitutes, such as denatured spirit, which has followed the adoption of that extreme policy.—I am, Sir, yours faithfully,

W. C. SULLIVAN.

London, Jan. 30th, 1917.

To the Editor of THE LANCET.

SIR,—I have read with great interest Dr. Edmund Cawley's address on the above subject published in your issue of Jan. 13th. Most of it might well have been delivered by an ardent advocate of a State Medical Service. He sees so clearly how inevitably the trend of things is towards the State assuming more and more responsibility for the health of its citizens, young and old, and he points out so well the defects of the present half-and-half system.

Though he cannot refrain from expressing his dislike of departmental officials, to whom he asserts, I think unjustly, that the interests of the profession are only of minor importance, he admits that there is no doubt that there has been an immense improvement in the control and prevention of diseases by the medical department of the Local Government Board and that good work has been carried out in its laboratories. He further admits that another set of departmental officials—the school medical officers—have done good work in securing efficient treatment for hundreds of children who would otherwise have been neglected. He might have gone further and admitted the excellent work of many other medical departmental officials. However, the point I wish to raise is whether the benefits Dr. Cawley admits to have taken place would have occurred if public health and medical inspection of school children had been left to private enterprise? The answer is obvious. Further, does the incidence of preventable diseases, the present high infant mortality-rate, and the percentage of children arriving at school age in some way physically or mentally defective (1 in 6), suggest that the present system of doctoring by private enterprise is satisfactory in its results? Surely it shows that however willing and capable individual doctors may be, the system is not one which can cope with the necessary work. If State interference and departmental officials have done much to control and prevent disease as admitted, is not the cure for these evils a still bigger dose of the same remedy?

There are many other points in the address on which I should have liked to comment, but I must not trespass further on your space. However, may I say in conclusion that I heartily agree with Dr. Cawley that it is incumbent on every member of the profession to watch and direct the current of

events. That current is flowing slowly, steadily, and unalterably towards a State Medical Service, and its strength has been intensified by the war, which has brought so prominently before the nation the importance of health and physical fitness and the urgent necessity for the preservation of child life. Let us so direct the current that, when a State Medical Service does come, it shall be one to which it will be both a pleasure and an honour to belong.

I am, Sir, yours faithfully,  
London, W., Jan. 26th, 1917. CHARLES A. PARKER.

### SPIROCHÆTAL JAUNDICE (SO-CALLED WEIL'S DISEASE).

To the Editor of THE LANCET.

SIR.—The admirable article, published in THE LANCET of Jan. 27th, by Captain A. Stokes, Captain J. A. Ryle, and Captain W. H. Tytler, has added very materially to our knowledge of this interesting and important disease. It seems to me that now is the time for settling the question of nomenclature, as the authors still associate Weil's name with the disease, although they mention that Martin and Pettit have recently pointed out how unjust this is, in view of the fact that it was described by several French authors, including Larrey (1800), Ozanam (1849), Monneret (1859), Laveran (1865), Lancereaux (1882), and Landouzy (1882), many years before 1886, when the Heidelberg professor published his paper. As there are certainly other forms of infectious jaundice, such as that of the Gallipoli epidemic, which was clinically quite distinct and was probably a result of infection with an organism allied to the *B. paratyphosus* A, the most suitable name seems to be the spirochætal jaundice, which has the advantage of being simpler than spirochetosis icterohæmorrhagica, suggested by the Japanese investigators. It is true that this name is not invariably quite appropriate, as the authors confirm the observations of Dawson and Hume<sup>1</sup> that the disease may occur without external signs of jaundice; but the name remains the most suitable of those which have been suggested, for the disease is always spirochætal in origin, and the jaundice, though inconstant, is the most characteristic symptom in the majority of cases, and appears to be constant in experimentally infected guinea-pigs.

I am, Sir, yours faithfully,  
Netley, Jan. 23th, 1917. ARTHUR F. HURST.

### PASSIVE HYPERÆMIA IN WOUND TREATMENT.

To the Editor of THE LANCET.

SIR.—Whilst applying Bier's method of treatment by passive hyperæmia to one of my own fingers from which the nail had been removed for a whitlow, I was impressed by the rapidity with which lymph exuded from the raw and granulating surface. This occurred within a very few minutes of the time of application of the elastic. Is not this effusion of bactericidal lymph precisely the result aimed at in Wright's method of treating septic wounds by hypertonic saline, and, if so, would it not be worth while to use Bier's method more frequently than (so far as my limited opportunities of observing show) is the case?

I am, Sir, yours faithfully,

R. L. GAMLEN,  
Captain, I.M.S. (retired).  
Brighton, Jan. 29th, 1917.

\* \* \* The flow of bactericidal lymph can be excited in very many ways, some being more convenient in one case and some in another.—ED. L.

<sup>1</sup> B. Dawson and W. H. Hume: Quarterly Journal of Medicine, 1916, x., 30.

THE COLLEGE OF NURSING, LIMITED.—Our Dublin correspondent writes: On Jan. 27th, at the Royal College of Physicians of Ireland, Miss R. C. Davies, matron of the Royal Free Hospital, London, and Miss Rundle, secretary of the College of Nursing, Limited, addressed an audience of medical men and nurses, with the purpose of explaining the objects of the College. They answered some of the objections said to have been put forward by Irish nurses, and a free discussion followed. It did not appear, however, that the Irish nurses are yet satisfied as to the wisdom of joining the College.

### The War.

#### THE CASUALTY LIST.

The following names of medical officers appear among the casualties announced since our last issue:—

##### Killed.

Capt. H. L. Jarman, R.A.M.C., attached S. Wales Borderers.  
*Lost in H.M.S. "Laurentio."*

Surg. F. E. Rock, R.N., was a student at Middlesex Hospital, and qualified in 1893. He was at one time assistant medical officer of health at Huddersfield, and, previous to rejoining the Royal Navy after the outbreak of war, he held the position of assistant medical officer of health and assistant school medical officer at Edmonton.

##### Wounded.

Lieut. J. A. Noble, R.A.M.C.  
Capt. M. A. McDonald, R.A.M.C.

#### DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

Second Lieut. J. A. E. Freud, R.F.A., eldest son of Dr. J. A. Freud, of Rosario, Argentine Republic, and Eastbourne, Sussex.

Second Lieut. C. H. P. Maurice, Royal Berkshire Regiment, eldest son of Lieut.-Col. W. J. Maurice, R.A.M.C.

Lieut. T. S. H. Schäfer, Northumberland Fusiliers, younger son of Professor Sir E. Schäfer, of Edinburgh University.

Lieut. A. McLintock, Duke of Wellington's West Riding Regiment, second son of the late Dr. J. McLintock, F.R.S., of Edinburgh.

#### THE HONOURS LIST.

The following awards to medical officers are announced:—

##### Distinguished Service Order.

Temp. Capt. Dyfrig Huws Pennant, R.A.M.C., attached Headquarters, R.F.A.

For conspicuous gallantry and devotion to duty. He dressed and remained with three wounded men under the most intense fire. He has at all times set a splendid example of courage and coolness, and has on many occasions done fine work.

##### Military Cross.

Lieut. Daniel Davies Evans, R.A.M.C. (Spec. Res.), attached Royal Dublin Fusiliers.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in collecting and attending to the wounded under very heavy fire.

Temp. Capt. Rupert Farrant, R.A.M.C., attached Shropshire Light Infantry.

For conspicuous gallantry and devotion to duty. During the whole day he tended wounded in an open trench which was subjected to a violent bombardment. On one occasion he led a party into "No Man's Land" and brought in several wounded men.

Temp. Capt. Frank Anthony Hampton, R.A.M.C., attached Royal Scots.

For conspicuous gallantry and devotion to duty. He continually went out under very heavy fire and remained in the open attending to the wounded with the utmost bravery and coolness. He has previously done fine work.

Temp. Capt. John Samuel Levis, R.A.M.C.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination when in charge of stretcher-bearers under heavy fire. He has on many previous occasions done fine work.

Temp. Capt. Francis Cromby Macaulay, R.A.M.C.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in collecting and attending to wounded under very heavy fire.

Temp. Capt. Philip Hugh Rawson, R.A.M.C., attached South Staffordshire Regiment.

For conspicuous gallantry in action. On several occasions he rescued wounded men under very heavy fire. He set a fine example of courage and coolness throughout.

Temp. Surg. George Lee Ritchie, R.N., attached Royal Naval Division.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in collecting and attending to the wounded under very heavy fire.

Capt. Arthur Ashton Smalley, R.A.M.C. (Spec. Res.).

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in attending to the wounded, working continuously for 48 hours under heavy fire. He set a fine example throughout.

Temp. Surg. Geoffrey Sparrow, R.N., attached R.N.D.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in collecting and attending to the wounded under very heavy fire.

**Capt. Wilmot Fenwick, Aust. Med. Corps.**

For conspicuous gallantry and devotion to duty. He worked continuously for 48 hours under very heavy fire tending and dressing the wounded. He set a splendid example of coolness and courage throughout.

The *London Gazette* states that the award of the Military Cross to Temp. Capt. Francis John Morris, R.A.M.C. (announced in THE LANCET of Jan. 6th, p. 38), is cancelled, and the following is substituted: Capt. John Morris, R.A.M.C. (T.F.), attached Cheshire Regiment.

**MENTIONED FOR DISTINGUISHED SERVICES.**

The names of the following medical officers have been brought to the notice of the Secretary of State for War for distinguished services rendered in connexion with the war:—

Lt.-Col. H. G. Barling, R.A.M.C.; Lt.-Col. H. P. W. Barrow, R.A.M.C.; Lt.-Col. A. W. Browne, R.A.M.C., ret.; Lt.-Col. H. E. B. Bruce-Porter, R.A.M.C.; Col. Hon. W. B. Collins, N.Z. Med. Corps; Lt.-Col. H. Davy, R.A.M.C.; Surg. Lt.-Col. P. J. Freyer, I.M.S., ret.; Capt. P. J. Gasikin, R.A.M.C.; Lt.-Col. G. M. Goldsmith, R.A.M.C.; Maj. G. L. Gulland, R.A.M.C.; Lt.-Col. H. A. Haines, R.A.M.C.; Col. W. H. Horrocks, A.M.S.; Lt.-Col. C. J. Jacomb-Hood, R.A.M.C.; Temp. Col. E. Jones, R.A.M.C.; Surg.-Gen. W. W. Kenny, late R.A.M.C.; Lt.-Col. Sir W. Arbuthnot Lane, Bt., R.A.M.C.; Col. D. J. MacKintosh, M.V.O.; Lt.-Col. W. J. Macnamara, R.A.M.C.; Temp. Lt.-Col. Sir T. Myles, Knt., R.A.M.C.; Col. E. North, late R.A.M.C.; Lt.-Col. T. H. Openshaw, C.M.G., R.A.M.C.; Lt.-Col. W. W. Pope, late R.A.M.C.; Capt. W. A. Robertson, R.A.M.C.; Lt.-Col. G. B. Stanisstreet, R.A.M.C.; Temp. Lt.-Col. J. Swan, R.A.M.C.; Temp. Hon. Lt.-Col. J. L. Thomas, C.B., R.A.M.C. (Maj., ret., T.F.); Lt.-Col. T. B. A. Tuckey, R.A.M.C.; Temp. Lt.-Col. W. A. Turner, R.A.M.C.; Lt.-Col. G. H. Twiss, ret. pay, late R.A.M.C.; Maj. W. I. de C. Wheeler, R.A.M.C.

**CENTRAL MEDICAL WAR COMMITTEE.**

A meeting of the Central Medical War Committee was held on Wednesday, Jan. 31st, when, arising out of some correspondence, a vote of the Committee was taken as to the advisability of members of Local Medical War Committees serving on the central body. It was unanimously decided that it was an advantage to the Central Medical War Committee to have local views represented to them in a direct manner.

The Committee considered the need still existent for a large number of medical officers to serve with the Army. A valuable report from the Assessment Subcommittee and the Executive Subcommittee, dealing with the calls made on Local Medical War Committees to meet the present demands of the War Office, was placed before the Committee, when Dr. C. Buttar, chairman of the Executive Subcommittee, detailed the various sources from which officers might be obtained, mentioning the possible reduction in all estimated figures, either through rejection by the War Office as unfit for service, or through successful appeals for exemption. Colonel Blenkinsop, who was present at the meeting at the request of the Director-General of the Army Medical Service, explained how the need for medical officers in the Army was affected by sickness and wounds, wastage and resignations, and indicated the places at which officers were at the moment urgently needed. An interesting discussion showed that the work of the Central Medical War Committee had been very strenuous and thorough, but that the demands of the medical profession will for some time remain pressing.

***Medical Examination of Medical Men under 41.***

The Central Medical War Committee is receiving many inquiries from medical men who come within the terms of the Military Service Acts as to the meaning of a request they have received from the military authorities to present themselves for medical examination. This request need not give rise to any misgiving. The position of enrolled men is not affected by it, for the question of whether they will be required to accept a commission in the Royal Army Medical Corps or not is one to be settled by the Central Medical War Committee in consultation with the Local Medical War Committee concerned. So much delay has, however, been caused in connexion with past calls by the uncertainty as to whether the men warned as being likely to be called for service were or were not physically fit that the War Office has decided to have all the doctors of military age examined and to have the question of physical suitability settled. Medical men receiving such a notice from the military authorities must comply with it, but need take no further steps until they hear from the Local or the Central Medical War Committee that any other steps are needed.

**THE TRANSFERENCE OF THE TRAINING ESTABLISHMENT OF THE ROYAL ARMY MEDICAL CORPS.**

We understand that it has been decided to transfer the training of the Royal Army Medical Corps from Aldershot to Blackpool, the reason for the measure being the extreme pressure on the accommodation of Aldershot camp. The dépôt of the Corps remains at Aldershot for the time being. The Royal Army Medical Corps has always much valued its position at Aldershot because it afforded opportunities which had been wanting at Netley for keeping in touch with metropolitan hospital practice, while propinquity was also secured to the Royal Army Medical School at Millbank. The transference of the training to Blackpool will therefore be much regretted by the Corps, and would, we feel sure, have only been made in response to the urgent need of the Army.

**TREATMENT OF BURNS AND SCALDS IN THE NAVY.**

Every ship in the Navy carrying a medical officer or surgeon-probationer has been recently equipped with an outfit for the paraffin treatment of burns and scalds, as have also all naval hospitals, hospital ships, and hospital trains. The paraffin preparation at present supplied is named "ambrine" by its inventor, Dr. Barthe de Sandfort, of Paris. Attention was first called to this method of treatment in THE LANCET<sup>1</sup> and *Times*, and Sir Arthur May, the Medical Director-General of the Navy, is to be congratulated on the promptitude with which he acted in the matter. Within a few days of the articles appearing in the journals he despatched one of his staff to Paris to investigate and report, and as a result of this report it was considered that the treatment had so much to commend it from a naval point of view, that no time should be lost in putting it in the hands of the medical staff of the Navy. And no better opportunity can be imagined for a thorough test of the efficiency of the treatment, as it is well known that burns and scalds form a good proportion of the injuries met with on board ship, not only during war but also in times of peace.

Not only did Sir Arthur May obtain the necessary information promptly, but the form in which he placed "ambrine" at the disposal of medical officers has given the treatment the best possible chance. The outfit, which we have seen in use, is neat and compact, and consists of a supply of the "ambrine," a small brush, a sprayer and bellows, together with clear and precise instructions for use, the whole being contained in a portable wooden box labelled "Dressings of Burns by Paraffin Wax." The methods of use, technique, cannot be better described than in the words of the printed instructions contained in each box, which are based on the teaching of the inventor of "ambrine" and which we quote verbatim:—

**DRESSINGS OF BURNS BY PARAFFIN WAX.**

The substance contained in this outfit is a mixture of paraffin and resins, and is termed by its inventor "Ambrine." It is solid when cold and becomes fluid when heated to 140°-150° F. It can be used as a "first-aid" dressing for burns and for their subsequent treatment if considered desirable. The originator of the preparation advocates its use for all classes of burns and employs it through the whole stage of treatment, and he claims that by so doing he has had excellent results.

***Methods of Use.***

(a) *Heating.*—Place a piece of the wax in the sprayer provided, and heat the latter over a spirit lamp, or set it in a basin containing a little water which should be kept boiling for ten minutes.

(b) *Precautions to be taken.*—Care should be taken to prevent any water getting into the wax. It must be remembered that the latter does not burn the tissues at 176° F., but the smallest quantity of water present would cause scalding. With the same end in view, the burnt area should be gently dried before the application is made. While the above is being heated, prepare a few fine layers of absorbent cotton; these layers should be as thin as possible.

(c) *The dressing.*—When the wax is in a liquid state and has been allowed to cool to a temperature of, roughly, from 140° to 150° F., it can then be applied to the burnt area either by means of the spray or the brush supplied for the purpose, or by the sprayer followed by the brush. If the sprayer is used the metal should be heated all over (including the nozzle), as any coagulation of the wax at this point will interfere with the proper working of the instrument.

The flame should be kept from the wooden handle and rubber bellows. *As regards the technique.*—The sprayer is first held about 9 inches from the patient, and the area is sprayed over until it has the appearance of being covered with a thin layer of hoar-frost. The sprayer is now brought closer (say 3 to 4 inches) and the bellows briskly worked; it will then be seen that in the centre of this spray-stream the wax assumes a liquid appearance. With this liquid spray the whole of the affected part is now quickly covered. A thin layer of cotton-wool is next laid on this wax, and the whole is then again covered with the liquid wax, by the brush. It is strongly recommended that the surgeon

should first try the method by applying two or three dressings to his own hand or arm.

*Note.*—When removing the lid from the sprayer do not hold it by the handle (as the leverages may buckle the side of the instrument). It should be held by the body of the sprayer, using a cloth if the metal is hot.

*When using the brush.*—Remove the lid of the sprayer, take the brush provided, and dip it in the liquid. Now spread the latter over the wound without pressing—that is as much as possible dabbing it and not brushing it on; this operation is repeated until the glazing is complete, taking care to leave no spot uncovered. Immediately afterwards place quickly on this first wax glaze one of the thin layers of absorbent cotton, already prepared as explained above, and then, with the same dabbing movement, put on several more applications of the fluid.

If the wound is extensive the operation is done on small square surfaces successively and close together (about 4 by 4 inches). These little squares thus become part of one another.

After the preparation (which with cotton-wool forms a shell or casing) has been allowed to cool, dressings and bandages can be applied in the usual manner. The initial use of the sprayer is recommended where the area is painful.

*Removing the dressing.*—For the first few days the waxy shell must not be left in place more than 24 hours; later, if it is desired to still employ it as a dressing, it can be left for 48 hours, or even longer.

To remove the dressing, untie the bandages and expose the "shell." An incision is made in the latter by means of a blunt knife or scissors, and the whole is peeled off. The wound is afterwards bathed with boiled water and the cleansing is further perfected by washing with absorbent cotton soaked in boiled water. Then it is dried either by a current of warm air or by a piece of cotton-wool, care being taken not to rub, or cause the granulations to bleed.

Antiseptic solutions should not be used (except very weak) and care should be taken not to apply the liquid at a temperature of more than 150° F.

Heating the wax in a bath of boiling water raises its temperature to nearly 212° F.; therefore before applying it to the burn, *with the brush*, it should be removed from the water bath and allowed to stand for a minute or two, so as to reduce its temperature to below 150° F.

It is claimed for the application that:

- (1) It immediately alleviates pain.
- (2) It constitutes a warm "shell" under which the tissues are protected against outside contamination, and are, as it were, "splinted."
- (3) It can be removed without pain or injury to the newly forming tissues, and thus limits the formation of scar tissue.

If the directions are followed, the dressing of burns by paraffin wax becomes a straightforward and even simple routine; and all who recall the agony undergone by the burnt patient at the hands of experienced people trying to remedy the condition according to the usual technique, will recognise that we are bestowing high praise.

The initial use of the sprayer is considered necessary in painful cases, and desirable in practically all, not only for its very soothing effects, but also because the injured area is first covered in thereby by a fine sterile coating, and contamination by direct contact with the brush, which even with the best intentions it may be difficult to keep clean, is avoided.

The inventor of "ambrine"—Dr. Barthe de Sandfort—has used it for treatment of burns and scalds at the Hospital St. Nicolas, Issy-les-Moulineaux, for some time past, and there can be no doubt with a good deal of success. He applies it all through from the very beginning, only finishing when sound healing has taken place, and has had good results with very severe burns even of the third degree. The newly formed skin is generally found to be soft and supple, scarring is greatly diminished or absent, and recovery is accelerated.

The results of the trials with "ambrine" now being carried out in the Navy in accordance with Sir Arthur May's instructions will be awaited with interest by the profession at large.

**THE RED CROSS.**—The County of London Red Cross Fair at the Central Hall, Westminster, will be opened on Feb. 15th by Princess Patricia of Connaught.—A cheque for £430 6s. 7d. has been received by the Joint War Committee of the British Red Cross Society and the Order of St. John from Sir Frederick Ponsonby, Keeper of His Majesty's Privy Purse, the proceeds of the sale of venison from the King's estates, which His Majesty directed should be given as a donation to the Red Cross funds.—The annual report of the Gloucestershire branch of the Red Cross Society shows that at present there are 22 Voluntary Aid hospitals with 2200 beds in the county. 16,800 patients have passed through these institutions since the commencement of the war.—Up to Dec. 31st last 53,450 loaves had been despatched to British prisoners of war in Germany by the dépôt at Copenhagen under the control of the Red Cross.

**AMBULANCES FOR THE BALKANS.**—On Jan. 30th 17 ambulance cars, fully equipped, which have been presented to the London Committee of the French Red Cross by Sir Lucas Ralli, senior partner in the firm of Ralli Bros., were

inspected in Hyde Park by the French Chargé d'Affaires (M. Picot). The cars comprise a full ambulance unit, and will be under the command of Major L. Lyon Clark (late North Devon Hussars).

**THE BATHS OF SIDMOUTH (DEVON).**—At the recent annual meeting of the Sidmouth Baths Company the chairman stated that alterations and additions were to be made in the equipment of the baths in order to enable wounded officers to have special treatment. The War Office had approved of the scheme and would defray the necessary cost.

**THE WOUNDED ALLIES RELIEF COMMITTEE.**—The Committee is presenting to the Queen of Roumania, through Madame Misu, wife of the Roumanian Minister in London, drugs and surgical instruments to the value of £500, for the benefit of sick and wounded soldiers of the Roumanian Army.

**THE SENATE OF LONDON UNIVERSITY** consider it advisable in the national interest to permit matriculated students to continue their studies until the age of 18 years and 8 months, or even 19 years, provided that they receive suitable military instruction for some hours weekly. Their resolution to this effect has been sent to the War Office and to the Board of Education.

## Medical News.

**ROYAL COLLEGE OF SURGEONS OF ENGLAND.** At the First Professional Examination for the Licence in Dental Surgery held on Jan. 25th and 26th the following candidates were successful:

**Mechanical Dentistry and Dental Metallurgy.**—Leonard Harry Braibar, Bristol University; and William Henry Turner, Guy's Hospital.

**Mechanical Dentistry.**—Myer Isaac Benischowitz, Royal Dental Hospital; Christopher Egerton George Busbridge, National Dental Hospital; Herbert William Hill and Wallace Inman, Royal Dental Hospital; Herbert Myers Marshall, Guy's Hospital; Edith Mynton Norman, National Dental Hospital; Hubert John Sanders, Bristol University; and Stanley Vernon White, Guy's Hospital.

**Dental Metallurgy.**—Ralph Martin Eland, Bristol University; and Arthur Douglas Ray, Manchester University.

**ROYAL COLLEGE OF PHYSICIANS OF LONDON.**—A Comitia was held on Jan. 25th, Dr. Frederick Taylor, the President, being in the chair.—Dr. V. B. Green-Armytage having passed the necessary examination was admitted a Member of the College. Eighty-three candidates having passed the requisite examinations were granted Licences to practise physic.—Diplomas in Public Health were granted conjointly with the Royal College of Surgeons of England to the following candidates: Dr. G. E. Beaumont, Oxford, Middlesex, and University College; Dr. V. Borland, Glasgow and University College; Mr. S. F. Chellappah, Ceylon and King's College; Dr. Una Griffin, Royal Free and University College; Mr. S. H. Paul, Charing Cross and King's College; and Dr. Mary A. van Ingen, Royal Free and University College.—Dr. J. Michell Clarke, Dr. W. E. Wynter, Dr. James Taylor, and Dr. Herbert Spencer were elected councillors.—Sir Francis Champneys was re-elected a Representative of the College on the Central Midwives Board.—Dr. Newton Pitt was elected a Representative Governor of the University of Bristol in place of Sir William Church, who had resigned.—Sir Dyce Duckworth was re-elected a Representative of the College on the Council of Queen Victoria's Jubilee Institute for Nurses.—The President stated that he had taken part in a deputation to the President of the Local Government Board, at the invitation of the Association of Municipal Corporations, urging that unqualified practitioners should be prevented from undertaking the treatment of venereal diseases.—The President also announced that he had appointed Professor R. Saundby to be Harveian Orator, and Dr. E. S. Reynolds to be Bradshaw Lecturer for this year, and that the Council had appointed Dr. T. M. Legge to be Milroy Lecturer for 1918.—A report was received and adopted from the Representative of the College on the General Medical Council (Dr. Norman Moore) concerning the meeting of the Council held in November last.—A report was received and adopted from the Committee of Management recommending that Rugby School, which is already recognised for instruction in chemistry and physics, should also be recognised for instruction in biology.

**RÖNTGEN SOCIETY.**—A general meeting of this society will be held on Tuesday next, Feb. 6th, at 8.15 P.M., at the Institution of Electrical Engineers, Victoria Embankment, W.C. Ordinary meetings of the Society will be held

at the same time and place on the following Tuesdays: Feb. 6th, March 6th, April 3rd, May 1st, and June 5th. Members desirous of reading papers or exhibiting apparatus are requested to communicate with the honorary secretaries at the earliest possible date.

**Mr. George Gidley, of Ashburton, Devonshire, died recently in his 102nd year.**

**Dr. William Fookes Thompson has been placed upon the commission of the peace for the borough of Launceston (Cornwall).**

**Professor C. S. Sherrington will deliver a discourse on "Recent Physiology and the War" at the Royal Institution this (Friday) evening in the place of Dr. Charles Carpenter.**

**Major John Bruce, R.A.M.C., will give a short lecture and demonstration at the Dermatological Section of the Royal Society of Medicine on Thursday, Feb. 15th, at 5 P.M., on "The Treatment of Scabies with Sulphur Vapour."**

**SCOTTISH POOR-LAW MEDICAL OFFICERS' ASSOCIATION.**—The committee in their report for the year 1916 state that owing to the scarcity of medical men a number of vacancies have not been filled up, although parish councils have advertised the appointments as open to women. Correspondence with the Highlands and Islands Medical Service Board had led to the discovery that the board did not, as was supposed, guarantee to all medical officers in the Crofting Counties a position including: (1) a suitable dwelling-house, rent free; (2) the necessary outlays in connexion with the working of the district; (3) a minimum income of £300 a year. The committee therefore proposed to return to their old position of warning applicants not to go blindfold into a district where the arrangements as regards income, area, and facilities might be unsatisfactory. The annual meeting of the Association will be held in the St. Enoch Hotel, Glasgow, to-day, Friday, Feb. 2nd, at 4.30 P.M.

## Appointments.

*Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

**CUMMING, J., M.B., C.M. Glasg.,** has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Hull District of the county of Yorks (East Riding).

**GARMAN, J. M., M.R.C.S., L.R.C.P. Lond.,** Medical Officer for the Sillinge District of the Elam Union.

**IRONSIDE, EVA CONSTANCE, M.B., Ch.B. Aberd.,** Deputy Medical Officer of Health for the Buckfastleigh (Devon) Urban District Council and Acting Public Vaccinator for the Buckfastleigh District of the Tivnes (Devon) Union.

**LANGRAN, WILLIAM, L.R.C.P., L.R.C.S., L.M. Edin., L.A.H. Dub.,** Commandant, and LUMSDEN, HARRY FOOTE, M.B., Ch.B. Edin., RAMSDEN-WOOD, WILLIAM EDWARD, M.D. Cantab., RICHARDS, NORMAN LLOYD, L.R.C.P., M.R.C.S., Medical Officers to the V.A.D. Hospital, Rhoda Hill, Uplyme, Devon.

**SHARPLEY, E., M.D. Durh.,** Certifying Surgeon under the Factory and Workshop Acts for the Louth District of the county of Lincoln.

## Vacancies.

*For further information regarding each vacancy reference should be made to the advertisement (see Index). When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.*

**BARNESLEY, BECKETT HOSPITAL AND DISPENSARY.**—House Surgeon. Salary £200 per annum, with board, &c.

**BATH WINSLEY SANATORIUM.**—Assistant Resident Medical Officer. Salary £250 per annum, with board, &c.

**BOLESKINE AND ABERARTH, PARISH COUNCIL OF.**—Medical Officer (and Vaccinator), &c. Salary between £350 and £400 per annum.

**BOLTON INFIRMARY AND DISPENSARY.**—Female Second House Surgeon. Also Female Third House Surgeon. Salaries £200 and £180 per annum respectively, with board, &c.

**BRISTOL GENERAL HOSPITAL**—House Surgeon for six months. Salary at rate of £175 per annum, with board, &c.

**CARDIFF, KING EDWARD VII.'S HOSPITAL.**—House Surgeon for six months.

**DERBYSHIRE ROYAL INFIRMARY, DERBY.**—House Physician and Casualty Officer. Also Resident Anaesthetist. Salaries £200 per annum, with board, &c.

**EDMONTON MILITARY HOSPITAL, LONDON, N.**—Medical Officers. Salary at rate of £1 per day and keep.

**ESSEX, ADMINISTRATIVE COUNTY.**—Tuberculosis Officer. Salary £500 per annum.

**GRIMSBY AND DISTRICT HOSPITAL.**—House Surgeon. Salary £5 5s. per week, with board, &c.

**GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.**—House Surgeon. Salary £200 per annum, with board, &c.

**HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, BROMPTON.**—House Physician for six months. Salary 30 guineas.

**HOSPITAL FOR SICK CHILDREN, GREAT ORMOND-STREET, LONDON, W.C.**—House Surgeon, Assistant Casualty Medical Officer, and House Physician, unmarried. Salary at rate of £60 per annum each, with board, &c.

**HOSPITAL FOR WOMEN, SOHO-SQUARE, W.**—Female Resident Medical Officer for three or six months. Salary £80 per annum, with board, &c.

**KENT EDUCATION COMMITTEE.**—Temporary School Medical Inspector and Medical Officer of School Clinic. Salary at rate of £350 per annum.

**LEAMINGTON SPA, WARNEFORD AND SOUTH WARWICKSHIRE GENERAL HOSPITAL.**—Second Resident Medical Officer. Salary £200 per annum, with board, &c.

**MAIDSTON, WEST KENT GENERAL HOSPITAL.**—Senior House Surgeon. Salary £250 to £300 per annum and all found.

**MANCHESTER ROYAL INFIRMARY.**—Resident Medical Officer. Salary £225 per annum, with board, &c.

**NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, QUEEN-SQUARE, W.C.**—Female Co-examiner to School of Massage.

**NORTHERN MUNITIONS FACTORY.**—Female Assistant Medical Officer. Salary £400 per annum.

**NOTTINGHAM AND MIDLAND EYE INFIRMARY.**—Female Resident House Surgeon. Salary £120 per annum.

**PORTREE, ISLAND OF SKYE.**—Parish Medical Officer and Public Vaccinator. Salary about £480 per annum.

**ROTHERHAM HOSPITAL.**—Junior House Surgeon. Salary £150 per annum, with board, &c.

**ST. MARK'S HOSPITAL, CITY-ROAD, E.C.**—House Surgeon. Salary as arranged, with board, &c.

**ST. PETER'S HOSPITAL FOR STONE, &c., HENRIETTA-STREET, COVENT GARDEN, W.C.**—Junior House Surgeon for six months. Salary at rate of £75 per annum, with board, &c.

**SALFORD ROYAL HOSPITAL.**—Honorary Physician for Diseases of the Skin.

**SHEFFIELD UNION HOSPITAL, FIRVALE.**—Female Resident Assistant Medical Officer. Salary £250 per annum, with rations, &c.

**STAFFORDSHIRE EDUCATION COMMITTEE.**—Female Assistant School Medical Inspectors. Salaries at rate of £400 per annum.

**SUNDERLAND ROYAL INFIRMARY.**—Female House Surgeon. Salary £150 per annum, with board, &c.

**UNIVERSITY OF LONDON.**—External Examiners.

**WELSH METROPOLITAN WAR HOSPITAL, WHITCHURCH, NEAR CARDIFF.**—Resident Medical Officer.

**WIGAN, ROYAL ALBERT EDWARD INFIRMARY AND DISPENSARY.**—Resident Surgical Dresser.

**THE CHIEF INSPECTOR OF FACTORIES, HOME OFFICE, LONDON, S.W.,** gives notice of a vacancy for a Certifying Surgeon under the Factory and Workshop Acts at Cleobury Mortimer, Salop.

## Births, Marriages, and Deaths.

### BIRTHS.

**ARCHER.**—On Jan. 23rd, at Monckton-road, Alverstoke, Hants, to Ada Caroline, wife of Charles W. Archer, F.R.C.S., Temporary Surgeon, R.N.—two daughters.

**HURRY.**—On Jan. 25th, at Berry Lodge, Shoreham-by-Sea, the wife of Captain H. R. Hurry, R.A.M.C., of a son.

**PATTISON.**—On Jan. 26th, at The Cottage, Hollow Meadows, Sheffield, the wife of C. Lee Pattison, M.B., B.S. Lond.—a daughter.

**STEVENSON.**—On Jan. 26th, at Burpham House, Farsham, Hants, the wife of W. Sinclair Stevenson, M.D., of a son.

### MARRIAGES.

**BREWITT-TAYLOR—ELLIS.**—On Jan. 27th, at Rosslyn Hill Chapel, Hampstead Raymond Brewitt-Taylor, M.B., younger son of C. H. Brewitt-Taylor, of China, to Evelyn, youngest daughter of Henry Ellis, of Potter's Bar.

**RAFFLE—MONRO.**—On Jan. 24th, at St. Michael's Church, South Shields, Captain Wilfrid Raffle, R.A.M.C., attached Coldstream Guards, to Nora, only daughter of Mr. and Mrs. Charles Monro, Hampstead, N.W.

**ROMER—WILLIS.**—On Jan. 25th, Harry Romer, M.A., M.B., B.Ch. Oxon., L.R.C.P., M.R.C.S. Eng., to Clara Lillian, second daughter of the late Mr. Newman Willis, of Finedon, Northants.

**VERTUE—WALLACE.**—On Jan. 31st, at St. Saviour's Cathedral, Southwark, Lieutenant Henry St. Hill Vertue, R.A.M.C., to Clementina Margaret, daughter of the late Rev. W. J. Wallace, formerly Rector of Mount Mellick, Queen's County, and of Mrs. Wallace, Albert-road, Sandycove, Co. Dublin.

### DEATHS.

**FARR.**—On Jan. 26th, suddenly, at Heath House, Andover, Ann Lawrence Augusta Mabel, the most dearly loved wife of Ernest A. Farr, J.P., and only daughter of the late Major-General and Mrs. I. L. Bolton, of Lt. Chasse, Jersey.

**HUMPHREYS.**—On Jan. 16th, at Richmond, Surrey, Henry Humphreys, M.A., M.D. Cantab., M.R.C.P., late Fellow St. John's College, Cambridge, aged 72 years.

**SANDIFER.**—On Jan. 23th, Henry Stephen Sandifer, M.D., F.R.C.S., of Dawson-place, W., aged 51 years.

**WILKINSON.**—On Jan. 25th, at The Maples, Blackheath, S.E., Francis Tichborne Wilkinson, Lieutenant-Colonel, R.A.M.C. (retired), aged 59 years.

**N.B.—A fee of 5s. is charge for the insertion of Notices of Births, Marriages, and Deaths.**

## Notes, Short Comments, and Answers to Correspondents.

### PUBLIC HEALTH IN NEW SOUTH WALES.

THE most important matters connected with public health administration in New South Wales during 1914 are dealt with in the report by Dr. Robert T. Paton, the Director-General of Public Health for the State, recently issued (Sydney: W. A. Gullick, Government Printer, 1916, price 7s.). Disposal of refuse, the working of the Pure Food Act of 1908, the standardisation of Australian manufactured food products, supervision of the meat-supply, treatment of tuberculous patients in State sanatoria and by special dispensaries, and fresh legislative measures for checking the spread of disease (including notification) and anti-typhoid inoculation are the chief subjects considered in this report. Further details are given in a series of departmental reports. Great care is taken in the inspection of foodstuffs; it was found necessary in many cases to take drastic action, condemn, and destroy large quantities that were totally unfit for human consumption; amongst other things, 53 tons of dried fruit, found to be riddled with insects, were seized and condemned. Dairies and slaughter-houses are inspected under the Public Health Act, but owing to the limited staff can only be visited once in eighteen months. The supervision of the meat export trade is of great importance to the State (as well as to the enormous numbers of persons in the United Kingdom who derive the greater part of their meat-supply from this source). During 1914 there were 437,429 packages of canned meats, and 1,925,756 carcasses of mutton and lamb exported, besides large quantities of beef, veal, and meat extracts. The health authorities in Europe and in the United States require a high standard for the inspection and sanitary handling of the meat exported from the Commonwealth. By arrangement with the Commonwealth Government a few years ago all inspections of meat in New South Wales were handed over to the Public Health Department of the State; the work is carried out by an experienced veterinary surgeon, assisted by fifteen inspectors. Meat for home consumption is inspected in similar manner. The prevention of venereal diseases and tuberculosis receives special attention; for the former it is recognised that the provision of adequate and easily accessible means of treatment is the only method by which the affected persons can be secured from the more disastrous effects of these diseases, and other persons protected from contracting infection. Two night-clinics have been opened, the numerous attendances at which have demonstrated the absolute necessity of taking special steps in this direction. For combating consumption nurse-inspectors are provided to visit and advise patients as soon as their condition comes to the knowledge of the health department; the cases are then classified into (a) those that can be cared for in their own homes and are well enough to attend the dispensaries; (b) those requiring removal to a sanatorium; (c) those in whom the disease is so far advanced as to render permanent medical care and maintenance necessary. The principal State sanatorium at Waterfall contains 370 beds; in addition at the Rookwood State Hospital there is accommodation for 100 male patients. It is intended to erect pavilions at Waterfall for the reception of an additional 100 males and to withdraw tuberculosis cases from Rookwood. The death-rate from pulmonary consumption has decreased most notably during recent years; in 1885 it was 1163 per million, in 1913 it was 669. Anti-typhoid inoculation has been carried out in the case of all troops leaving for active service in Europe or elsewhere since the beginning of the war, two inoculations having been given to about 18,000 men and vaccine supplied sufficient to protect a further 50,000. Only four persons were found to be suffering from leprosy during 1914. A considerable number of the Public Health staff—some 20 in all—were called up for military duty during the year; much work was also carried out by the medical officer of the department in advising the military authorities in regard to camp sanitation, examination of food-supplies, &c. The report by Dr. J. Burton Cleland on work done in the Bureau of Microbiology is a record of nearly 20,000 examinations, micro-biological, pathological, and medico-legal, as well as of investigations into various special subjects by the director and his assistants. Numerous illustrations, charts, and diagrams add to the value of this record of public health progress in New South Wales during 1914.

### THE PREVENTION OF VENEREAL DISEASES.

*To the Editor of THE LANCET.*

SIR.—Now that the experiments of Metchnikoff and Roux in 1904 upon apes have confirmed the practice of M. Cumanus, who, in 1495, recommended the use of mercurial ointment in the prevention of syphilitic infection, one may hope that even in England, to-day, one will not be accused of "gross

precipitancy" in suggesting that all chemists will put up for sale little cases containing drug preventives against gonorrhoea, chancre, and syphilis. Some years ago I obtained a case from a firm of chemists in Berlin, where it was being sold publicly at about two marks. Our Navy and Army Services have at last recommended it. No doubt the preventives will be a very great financial loss to doctors and chemists. One firm told me that it would mean a loss to them of about £8000 a year. Some years ago I had a large number of cases made up, and if anyone wishes to obtain a sample box for the use of males I will send one to any doctor or chemist on receipt of 5s. I have estimated that about £96,000,000 are yearly expended upon prostitution and its accompanying conditions in the United Kingdom, and if venereal diseases could be reduced even by 75 per cent. this would be a great saving to voluntary and Poor-law hospitals and in asylum expenditure.

Liverpool, Jan. 29th, 1917.

I am, Sir, yours faithfully,

ROBERT R. RENTOUL.

### "THE NEW HAZELL ANNUAL AND ALMANACK" AND "WHITAKER'S ALMANACK."

THESE two reference books, which every well-informed public, professional, and business man will find frequent occasion to consult, have appeared as usual in spite of the difficulties of compiling and publishing under war conditions. The first-named, which is in its thirty-second year of issue, has now become "The New Hazell Annual and Almanack," and is published by Messrs. Henry Frowde and Hodder and Stoughton at 3s. 6d. net. The scope has been extended, and besides containing recent and authoritative information concerning the British Empire and the nations of the world the Almanack contains much useful astronomical and cognate matter. Adequate space is given to the events of the war, the trade of the future, and the like, while an exhaustive index facilitates ready reference. Although appearing before the end of 1916, an inset page gives the personnel of the present Government.—"Whitaker's Almanack," appearing a week or two later, is now in its forty-ninth year, and the reader may be assumed to have a general familiarity with its contents. Owing to the increased cost of production the price has been raised from 2s. 6d. to 3s. 6d. net. Full value is given for the money in the information concerning the Government, finance, population, commerce, and statistics of the nations of the world, while the astronomical details are as complete and accurate as always. A new and important feature is a series of short articles on the industries of the British Empire, each written by an expert in his own department. A page is devoted to a summary of the efforts now being made to combat venereal diseases, and another to the progress of the past year in the field of sanitation.

### THE CONSERVATIVE TREATMENT OF BURNS AND SCALDS.

*To the Editor of THE LANCET.*

SIR.—I notice a very valuable contribution in your issue of Jan. 27th by Mr. G. J. O'Reilly upon this subject. I have upon several occasions been in attendance upon severe cases of scalds, one notable case being when a vat of boiling sugar burst its hoops during the process of refining and severely scalded two workmen from head to foot. Upon another occasion a man became severely burnt upon the trunk, legs, arms, and face by an explosion of petrol upon a motor-launch.

In these cases, as well as in some others, I have adopted the method described by Mr. O'Reilly—viz., a large dose of opium and rest without attempting to remove the clothing. The results could not have been better.

I am, Sir, yours faithfully,  
CHRISTOPHER KEMPSTER.  
Harley-street, W.C., Jan. 30th, 1917.

### ANNUAL REPORTS OF THE LOCAL GOVERNMENT BOARD.

Dr. J. H. L. Cumpston, Director of Quarantine for the Commonwealth of Australia, has solicited our help in obtaining a complete set of the Annual Reports of the Local Government Board of England and Wales for the medical library at the Federal Quarantine Bureau. Prior to the publication of the present series in 1874 there were issued Annual Reports of the Medical Officer to the Privy Council, which are now of definite historical value, and it is a complete series of these earlier volumes which it is desired to obtain for the library. Dr. Cumpston states that through the courtesy of the Local Government Board he has secured a number of these volumes, but the first report and the third to ninth inclusive are missing. Any of our readers who know of the existence of copies of these reports should communicate direct with Dr. Cumpston, at the Federal Quarantine Bureau, Spring-street, Melbourne.

*Esculapius.*—The description of the position may be substantially accurate; we are inclined to think that some of

the stricture is deserved, but our leading article was written precisely with the purpose of avoiding recrimination at this juncture.

**W. R. B. (Newfoundland).**—The outlook for the patient is not very favourable at her age. Delusions if taken at their earliest stage are often amenable to treatment. The co-operation of a competent alienist should be obtained.

**W. A. W. and Others.**—The interesting devices for first-aid will be likely to attract the attention of Red Cross officials and workers if exhibited in the museum of the College of Ambulance, 3, Vere-street, London, W. Application should be made to Colonel James Cantlie at that address.

COMMUNICATIONS not noticed in our present issue will receive attention in our next.

## Medical Diary for the ensuing Week.

### SOCIETIES.

**ROYAL SOCIETY,** Burlington House, London, W.

**THURSDAY.**—Papers:—Lord Rayleigh, Q.M.: On the Dynamics of Revolving Fluid; Prof. H. Lamb: On the Deflection of the Vertical by Tidal Loading of the Earth's Surface; Mr. G. F. Brush and Sir R. Hartley: Spontaneous Generation of Heat in Recently Hardened Steel.

**ROYAL SOCIETY OF MEDICINE**, 1, Wimpole-street, W.  
MEETINGS OF SECTIONS.

Wednesday, Feb. 7th.

**OPHTHALMOLOGY** (Hon. Secretaries—Himore W. Brewerton, Arthur W. Ormond): at 8.30 P.M.

*Clinical Case:*

Mr. G. Hartridge: (?) Rupture of the Optic Nerve.

*Papers:*

Mr. Arnold Lawson: Three Cases of Fur Infection of the Conjunctiva.

Mr. P. C. Bardsley: The Retinal Signs of Arterio-sclerosis compared with those due simply to Increased Blood Pressure.

Friday, Feb. 8th.

**CLINICAL** (Hon. Secretaries—David Forsyth, T. P. Legg): at 8 P.M.

*Cases:*

Dr. Parkes Weber: (1) Congenital Non-familial Jaundice without Splenomegaly in an otherwise Healthy Man aged 50 years; (2) Acro cyanotic Type of Sclerodactyly with commencing Generalised Scleroderma of Face and Chest; (3) Cases of Acromegaly.

*Paper:*

Dr. Parkes Weber: Two Cases of Primary Cancer in the Liver in one of which Thrombosis of the Inferior Vena Cava occurred.

**ROYAL SOCIETY OF ARTS,** John-street, Adelphi, W.C.

**MONDAY.**—4.30 P.M., Cantor Lecture:—Prof. A. B. Pite: Town Planning and Civic Architecture. (Lecture II.)

**WEDNESDAY.**—4.30 P.M., Dr. R. F. Fox: The Future of British Spas. RÖNTGEN SOCIETY, Institution of Electrical Engineers, Victoria Embankment, W.C.

**TUESDAY.**—8.15 P.M., General Meeting. Paper:—Mr. E. B. F. d'Albe: Some Properties and Applications of Selenium.

### LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

**POST-GRADUATE COLLEGE,** West London Hospital, Hammersmith-road, W.

**MONDAY.**—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

**TUESDAY.**—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

**WEDNESDAY.**—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Parfitt: Operations.

**THURSDAY.**—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

**FRIDAY.**—10 A.M., Dr. Simson: Gynaecological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

**SATURDAY.**—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Parfitt: Operations.

**ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN,** 49, Leicester-square, W.C.

**TUESDAY.**—4 P.M., Dr. J. L. Bunch: Some Common Skin Diseases.

**WEDNESDAY.**—5 P.M., Dr. W. Griffith: The Pathology of Diseases of the Skin.

**THURSDAY.**—6 P.M., Chesterfield Lecture:—Dr. M. Dockrell: Coccus Diseases of the Skin and Hair.

**ROYAL INSTITUTE OF PUBLIC HEALTH,** Lecture Hall of the Institute, 37, Russell-square, W.C.

*Courses of Lectures and Discussions on Public Health Problems under War and After-war Conditions:*

**WEDNESDAY**—4 P.M., Lecture IV.:—Lady Barrett, M.D.: The Role of the Midwife and the Protection of Motherhood. Prof. E. W. Hope, Miss R. Paget, Miss J. Halford, and Dr. C. Berkeley, have promised to take part in the discussion.

### EDITORIAL NOTICES.

It is most important that communications relating to the Editorial business of THE LANCET should be addressed exclusively "To the EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET should be addressed "To the Manager."

We cannot undertake to return MSS. not used.

Offices: 423, STRAND, LONDON, W.C.

### MANAGER'S NOTICES.

#### VOLUMES AND CASES.

VOLUMES for the second half of the year 1916 will be ready shortly. Bound in cloth, gilt lettered, price 16s., carriage extra.

Cases for binding the half-year's numbers (inland edition) are now ready. Cloth, gilt lettered, price 2s., by post 2s. 4d. To be obtained on application to the Manager, accompanied by remittance.

#### ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the new year, the price was raised to 8d. The rates of subscription remain as revised in October.

#### TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C., are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and not to THE LANCET Offices.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

#### TO COLONIAL AND FOREIGN SUBSCRIBERS.

Subscribers abroad are particularly requested to note the rates of subscription given on page 6.

The Manager will be pleased to forward copies direct from the Offices to places abroad at the rates shown, whatever be the weight of any of the copies so supplied.

#### NEWSPAPERS FOR NEUTRAL COUNTRIES.

Newspapers are not at present being sent forward to neutral European countries unless posted direct from the office of publishers or newsagents who have obtained permission from the War Office for this purpose. The Publisher of THE LANCET has obtained the required permission, and he will forward copies direct from the Office to any neutral country on receipt of instructions.

#### METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Jan. 31st, 1917.

Date.	Rain-fall.	Solar Radio in Vacuo.	Maxi- mum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
Jan. 25	...	36	32	30	31	31	Overcast
" 26	...	43	43	29	29	29	Overcast
" 27	...	60	35	29	31	31	Cloudy
" 28	...	42	34	29	30	30	Cloudy
" 29	...	39	33	29	30	30	Overcast
" 30	...	48	34	28	30	30	Overcast
" 31	...	40	36	30	32	32	Snowing

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

**Communications, Letters, &c., have been received from—**

- A.—Messrs. Allen and Hanburys, Lond.; Aymard Patent Milk Sterilizer Co., Ipswich; Dr. M. S. Ayoub, Aga; Mr. F. Aldridge, Lond.; Administrative County of Essex, Chelmsford, Clerk to the; Capt. D. C. Aikenhead, C.A.W.O.; Capt. A. Abrahams, R.A.M.C.; Dr. E. Ash, Lond.; Admiralty Medical Dept., Director General of; Dr. D. McC. Aitken, Lond.; Messrs. Arnold and Sons, Lond.; Messrs. Arnold and Sons, Lond.; Anglo-French Drug Co., Lond.; Prof. F. W. Andrews, Lond.; Messrs. Claudius Ash, Sons, and Co., Lond.; Anderson College of Medicine, Glasgow; American Journal of Clinical Medicine, Chicago, Librarian of; Insurance Committee for the County of London.**
- J.—Major I. D. Jones, I.M.S.; Mr. M. L. Jones, Great Malvern; Messrs. E. H. Jackson and Co., Lond.; Messrs. W. Judd, Lond.**
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**A Series**  
OF  
**500 EMERGENCY OPERATIONS FOR**  
**ABDOMINAL WOUNDS.<sup>1</sup>**

BY C. FERRIER WALTERS, F.R.C.S. ENG.,  
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ROYAL INFIRMARY.

*With a Prefatory Note*

BY SIR ANTHONY BOWLBY, K.C.M.G., K.O.V.O.,  
TEMPORARY SURGEON-GENERAL AND ADVISORY CONSULTING SURGEON  
TO THE BRITISH ARMIES IN FRANCE.

**PREFATORY NOTE.**

I HAVE been invited by the surgeons responsible for this record to preface their communication with an explanatory statement of the surgical conditions in which their work was done, and a knowledge of these will, I think, be of interest. It is well known that most surgical operations at "the Front," including those on the abdomen, are performed in the casualty clearing stations, and a large number of the latter are established at suitable places behind the firing line. At two points, however, it was not possible to place so large a unit as a casualty clearing station exactly where it was required, and as a result of this smaller units were established, such as "emergency hospitals," to deal with those patients who could not easily be taken farther back. It was at the larger of these that the authors of this communication did their work, and in addition to treating a certain number of very serious wounds of the chest and other regions they were called upon to take charge of most of the cases of abdominal wounds occurring in their area. The cases here recorded all form a consecutive series.

The hospital was housed in a good, modern, steam-heated village hospice. It had already one small operating theatre and another was quickly added. The proximity of several casualty clearing stations, with equal equipment for operations, made it possible effectually to prevent overcrowding of the hospital or overworking of the staff, for, if the latter became unduly pressed, suitable cases could always be sent to the casualty clearing station, and only the worst class retained. By this arrangement also it was easy to prevent any patient being kept waiting an unduly long time, and so to give him the best chance of recovery.

I am in complete agreement with the authors in their expressions of opinion as to the cases that should not be operated upon, and I would specially emphasise the advisability of leaving alone almost all patients shot in the region of the solid viscera, and particularly "through and through" the liver, for I am sure that I have more often seen harm than good come of surgical interference. There are certainly some exceptions to this rule, but not many. I would also lay especial stress on the advisability of not operating when more than 36 hours have passed since the infliction of a wound in the intestine area. Out of the many hundred patients who have been operated upon I know of only three or four cases of recovery after so long a delay. On the other hand, I have seen a certain number of cases such as are alluded to in this paper where operation has done more harm than good by disturbing recently formed adhesions and early processes of repair. It can no longer be doubted that patients with perforations of the hollow viscera can recover if the lesion is not too large, even though such recoveries are rare, and very few in proportion to the recoveries after early operation. It must also be remembered that many missiles have been

known to pass across the stomach and intestine areas without wounding these viscera, and it is therefore not to be supposed that a patient who is not operated upon has no chance of recovery. I have seen many who have recovered, and I am sure that the advice given by the authors is advice that should, with rare exceptions, be followed.

This record of 500 operations for gunshot wounds of the abdomen performed in a single hospital is, I suppose, unique, and it consequently gives to the opinions of the authors a corresponding value. All surgeons still employed in the treatment of such cases will especially appreciate the caution with which the authors draw their conclusions, and will value their advice the more.

A table will be found in this paper giving the results of our first 500 operations for abdominal war wounds, but the object of the paper is rather to summarise the results of our experience as to diagnosis and treatment of these cases than to attempt any elaborate description of them. We apologise in advance to readers engaged in similar work for many statements which will appear elementary or obvious to them but may be of use to even experienced abdominal surgeons undertaking this work for the first time.

The patients arrive direct from the Field Ambulances who label and send by special car all abdominal or doubtful abdominal cases. The time elapsing between wounding and arrival naturally varies considerably. A large number of patients have been received as early as three hours after the infliction of the wound, but the average is a good deal higher than this, and with the advance of the line and the more mobile conditions of fighting the time has tended to increase. For the benefit of those without experience of the Front it should be pointed out that the delay, which, of course, is quite unavoidable, occurs in getting the wounded men out of the battle area, only a small fraction of the time is occupied in the transfer by motor ambulance on the road, so that the difficulty of the time element is not entirely solved by simply establishing hospitals very close to the line—a mile or two either way is unimportant.

*Time Element in Prognosis and Treatment.*

It may be as well at this juncture to discuss the above point. Statistics are fallacious; they may show but little difference in the mortality of a series operated on four hours after wounding and another in which eight or nine hours have elapsed. The reason is that patients who were operable four hours after the wound may have become inoperable or died before eight hours have gone by, and the second series will necessarily contain cases with less severe injuries than the first.

From a careful comparison of similar cases we are quite positive that the time element is of the highest importance, and that an abdominal patient's chances diminish with every hour of delay.

The vast majority of our patients have reached us within nine or ten hours and a large percentage in half that time, but a certain number of cases arrive at much later periods, up to three or four days in the case of men who have been lying out. The treatment of such late cases must be entirely different from the early ones. It is nearly always wise to adopt an expectant attitude. If the patient is in operable condition after 48 hours it may be assumed that the visceral injury is not severe and haemorrhage has entirely ceased, while Nature has made some effort to deal with the condition.

Every case must be judged on its own merits, but operation thus late has a very high death rate. As a working rule we should say that a man in fair condition who has been wounded more than 36 hours should always be watched, unless there is some clear indication that there is a condition which must be fatal without interference. In cases much later than this—four or five days—here is usually obvious general peritonitis, and here it is wisest simply to drain the pouch of Douglas through a small incision, an operation of a few minutes only. We have had several successful cases of this kind in which doubtless intestinal wounds had been closed by adhesions.

It is most necessary in late cases of this kind to bear in mind the fact that all unoperated cases are not fatal, that severe visceral injuries can be and are cured by natural means, and that, speaking generally, while operation under suitable conditions enormously increases the patient's chances

<sup>1</sup> A summary of the facts and opinions contained in this paper has been read at a meeting of the Fifth Army Medical Society in France.  
No. 4876

of recovery, it can hardly be said that it is impossible for any patient to recover without it. We know that the mortality of large series of cases operated upon is as near as possible 50 per cent. We have no actual data as to what the mortality would be if the same cases were left without operation, but there is some reason for supposing that it would be somewhere in the region of 90 per cent. In many individuals, however, the patient's condition may make it certain that his chances of surviving operation will be represented by a number much below the average of 50 per cent., while it may be that in the same individual the nature of his wound and the probable injury present will render it likely that he would have a much better than 10 per cent. chance if left. And it is where one believes that a case is so much below the average of one class and above that of the other that the figures are reversed, that expectant treatment is adopted.

#### *Diagnosis and Prognosis on Admission.*

Two questions are continually arising when a new patient is examined. Is he fit to stand operation? Is he suffering from a true penetrating abdominal wound with injury to hollow viscera? Of course, a large number arrive in whom neither of these points is doubtful, but in perhaps half one or other question will come up, and to some of them both will apply. The determination of the answer to these questions is undoubtedly by far the most difficult problem which the surgeon has to face, and it is here, far more than in actual operating, that experience is of value.

A detail we have found most helpful is the establishment of an observation ward. This ward is on the ground floor, is furnished with beds with blankets only, and no patient remains in it long. Into it are sent all doubtful cases, and, in addition, those hopelessly moribund and those who can be pronounced off-hand to have non-penetrating wounds and who are merely waiting for transport to a clearing station. It is in connexion with the doubtful cases that this ward is so valuable. They cannot be left on stretchers, and we have found that if they are admitted to the ordinary wards and mixed with operation cases they inevitably tend to be overlooked for hours during the extreme times of stress and hard work which occur in heavy fighting. In the observation ward each bed is prominently labelled with the name of the surgeon under whom its occupant has been admitted, and the surgeons make a practice of constantly visiting this ward throughout the day, however busy. Where a number of patients collect for operation the best way to arrange the order in which they shall be taken is to leave till last and for further consideration the *doubtful* cases, and of those undoubtedly requiring operation to take invariably the men in best condition and the most hopeful cases first.

To discuss first the question. Is a given patient well enough to stand operation? The obviously moribund man—cold, pulseless, and dying—presents no difficulty, while, on the other hand, there is as a rule no doubt about the patient whose condition is good and who has been wounded four or five hours only. There is no question at all that if there is the least doubt as to whether or not there is an injury to hollow viscera, such patients should all be operated on at once. In them the actual shock of laparotomy is not a danger to life, so that if nothing is found there is no harm done, while if there is even a small visceral wound it can be closed in time to be of determining value in the issue of the case.

The difficulty lies with the patients whose condition is poor, who have been wounded for many hours, and who may present the additional problem of the uncertainty of diagnosis. The main principles which govern one's decision in these cases are as follows. If there is no doubt at all that the patient has a serious visceral injury which must be almost certainly fatal without operation—for example, a protrusion of injured intestine—he should be operated upon unless actually moribund. But he will often benefit by a delay of two hours. We have found by experience of many cases that a most marked improvement often occurs if a patient is kept in the ward, warm and at rest, for an hour or two. On the other hand, experience has also shown that a patient who shows no sign of improvement in two hours seldom recovers sufficiently to be operable in any less period than 30 or 40 hours.

Supposing, upon the other hand, that the patient's condition is bad but not inoperable, and at the same time there is doubt about the diagnosis of a severe injury to hollow viscera, the surgeon has to balance in his mind the chance

the patient will have after operation with the chance that he has an injury from which he will not reasonably recover without it. We should say in such cases where the one certain fact is that operation is going to be very dangerous, give the patient the benefit of the doubt by not operating.

#### *Diagnosis of Penetrating Abdominal Wounds.*

To turn now to the second question which arises in examining a new patient—Has he a penetrating wound and is there an injury to a hollow viscus? A point may be mentioned at once which is of importance. A man may have a severe injury to a hollow viscus without penetration of the peritoneum. This is particularly the case where the missile has torn the abdominal wall and bared, but not entered, the parietal peritoneum. We have had more than one such case in which the subjacent loop of small intestine was torn almost in two.

Another preliminary point which also occurs is the question of operation for wounds of solid viscera. Owing to their occurrence in conjunction with other wounds, injuries to the solid viscera are frequently encountered and treated in the course of an operation; but supposing that it is believed that only a solid viscus is injured, is operation indicated? We consider that it is not, with the possible exception of a kidney wound in a man whose condition is good. Wounds of the liver are seldom, if ever, benefited by operation; if very severe they are fatal, and if not severe the haemorrhage has usually ceased, and the surgeon checks by packing or suture the haemorrhage he has created by interference. The same applies to small wounds of the spleen. It is only in an obvious spleen wound where the patient is plainly suffering from haemorrhage more than shock that an operation is indicated with a view to splenectomy.

So that, speaking generally, the essential point in diagnosis is the injury of hollow viscera. There is, of course, a type of case which presents no difficulty—that in which there is a protrusion of intestine or an escape of intestinal contents, fluid, or gas through the wound, or where an injury to a viscus can be felt or seen through the wound. Sometimes surgical emphysema due to intestinal gas may be felt beneath the skin, while in one case gas had escaped along the cord and distended the scrotum.

With regard to cases with protrusion of viscera, the most important point, of course, is the condition of the intestine, whether injured itself and whether strangulated. In the event of its being neither the prognosis is not very bad. We have had a case in which the whole small intestine, the transverse colon, and the great omentum were prolapsed through the wound; it was covered with mud and wrapped in a khaki shirt, and had been so for eight hours; there was no strangulation or injury. The intestine was roughly cleaned and rapidly returned under anaesthetic, and the man made a good recovery. On the other hand, where there is a necessity for resection in these cases they are nearly always fatal. Projecting omentum, in itself not a serious condition, when found to occur, nearly always denotes a visceral injury. In this way it is an indication for operation.

The next type of case to be considered is the "through-and-through" wound. Here it is often possible to settle the diagnosis by a consideration of the line of direction of the wound upon anatomical grounds; but when this is done the line must be most carefully contemplated. With an entry in the flank and an exit by the umbilicus—for example, a wound which on a casual glance would seem to pass right through the peritoneal cavity—the wound may upon careful consideration be found to lie wholly in the muscles, while there are several fallacies in connexion with through wounds in the pelvis and upper abdomen.

The only advice one can give is to carefully consider the anatomy of the part. Remember especially the high position of the splenic flexure, and, lastly, if all other symptoms and signs are against a visceral wound do not depend on anatomical considerations alone.

The degree of dilatation of stomach or bladder and the position of the diaphragm at the moment of being hit are factors impossible to determine, while lastly, it should be remembered that men are not hit in the position in which they are examined—but often with the back extremely bent. Nevertheless the first and most important step in diagnosing these cases is a careful attempt to get all possible information from the position and nature of the wound. Exploration by finger and probe should be done wherever possible.

The final type of case remains in which the diagnosis has to be made from symptoms and an examination of the abdomen alone. It is, of course, a truism with everyone who has seen many of these cases that wounds in the chest alone may give all the signs of an abdominal injury, while wounds in the back and buttocks which give rise to retroperitoneal haematomata may set up marked abdominal rigidity and tenderness.

First as to *symptoms*. Pain is an uncertain and misleading one, especially in view of the fact that so many of these patients have had large doses of morphia. There is fairly frequently in true visceral wounds a history of intense pain a few minutes after the wound, passing off later. We have frequently noted shoulder pain in wounds of the diaphragm—an interesting referred pain which has been described before.

Vomiting is of distinct value in diagnosis. A majority of all our patients with visceral injuries had vomited before admission, and a minority only of those cases in which abdominal penetration was suspected and which subsequently proved not to be the case. Vomiting is particularly common in stomach injuries, and the absence of haematemesis in no way negatives such. A history of the passage of flatus since the wound is against any wound of the colon, especially the descending colon.

A last point of importance is to notice carefully the patient's appearance. A normal facial appearance is very greatly against a severe abdominal lesion, even if the pulse is bad, while an appearance of extreme shock may give a better hint of the truth than the pulse.

#### *Abdominal Signs.*

*Rigidity* and absence of free movement is of the utmost importance from a negative point of view. Its complete absence almost precludes a visceral injury; on the other hand, its presence may be due to a number of other causes—chest wounds, retroperitoneal haematoma, or injury to abdominal wall alone.

*Tenderness* is a far more valuable positive sign. Its undoubted presence at some little distance from the wound, and especially at the other side of the abdomen, is almost diagnostic of a visceral injury. There are, however, two other possibilities—haemorrhage in the peritoneum alone may produce it and haemorrhage in the tissues of the anterior abdominal wall will actually produce the most extreme tenderness. We have not found the attempt to define areas of hyperesthesia of any value.

*Percussion signs* are peculiarly fallacious and valueless in these cases; we attach almost no importance to them. *Rectal examination* is seldom of any value. *The passage of a catheter* may afford valuable information where injury to the urinary tract is suspected.

The last question in regard to diagnosis is as to whether to explore or to wait in a case in which it is impossible to at once make up one's mind. The deciding factor is the patient's condition. As has been said before, if this is sufficiently bad to reduce his chances of recovery after operation to probably 1 in 10 or even 1 in 5 it is far better not to operate, since even with a perforating visceral injury his chances when left may be as good as this. On the other hand, if the patient's condition is good, so that operation presents very little risk, and the wound is so recent that possibly serious visceral injury is present, it is far better to explore; if necessary, a very small incision may be made in the middle line and a swab inserted into the pouch of Douglas, to determine the presence or absence of blood. On the whole, it is far more satisfactory to explore than to wait and see when dealing with doubtful wounds in patients recently wounded and in good condition. We have done a number of such laparotomies with negative results, and the few who have died have all had serious complicating limb or other wounds.

However, occasionally the existence of a hollow viscus wound is so exceedingly doubtful that it is unjustifiable to operate. In that case, if the patient is watched, look rather for an improvement which should take place than expect the presence of visceral wound to soon render the patient worse. Such cases frequently remain quiescent for long periods and then suddenly and rapidly take a turn for the worse. A rising pulse-rate (in the absence of an increasing temperature) is nearly always an indication to operate even if the man is quite comfortable.

#### *Contra indications to Operation.*

The only complete contra-indication that we observe (apart from the condition of the patient) is a complete spinal lesion with paralysis. With such diagnosis is almost impossible—since it will give every abdominal sign and symptom without penetration, and in addition the prognosis, if operation is done, is practically hopeless. Those who encounter abdominal wounds for the first time are warned against overlooking a spinal lesion. Every patient should be asked to move his legs.

An almost complete contra-indication is a wound of the chest definitely involving lung (with haemoptysis or surgical emphysema). With such the mortality after operation is enormous; our only cases of recovery had solid viscera wounds from which they might have recovered if left. We are of opinion that such patients' chances are almost always better if left alone. Operation should be confined to such a rare case as where, with protruded viscera or otherwise, a hopeless abdominal condition can be actually seen, and in addition, for some reason, the patient's general condition is reasonably good.

Serious other wounds form an important complication in many cases. Where there is a limb wound which demands amputation perhaps the best chance is to do the abdominal operation first and risk the leaving of the amputation till a few days later. If both must be done together it is possible to get an additional surgeon to amputate while the abdomen is being operated on. We have not had a successful case of this kind, but in one which survived for some days the patient appeared to suffer less shock than would have been likely if the operation had been prolonged to over two hours by doing the two successively.

#### *Operative Measures.*

*Anæsthesia.*—Most of our cases have been given open ether with or without chloroform; atropine is usually given previously. Shipway's warm ether apparatus has been used lately with excellent results. The anaesthetic is often difficult, and experienced anæsthetists have proved their worth.

*Salines.*—It will be convenient to discuss now the giving of salines before, during, and after operation. The first point, confirmed again and again in this hospital, is that salines are of little use in shock and of the utmost value in haemorrhage. Recent work on the specific gravity of the blood in these conditions has thrown some light on the cause of this phenomenon. Unfortunately in most abdominal cases both factors are present, but it is usually easy to convince oneself that the value of the saline varies with the proportion of the haemorrhage element to the shock element. Intravenous saline has sometimes been given to bad cases in the observation ward, but has been found useless. In severe shock the effect is momentary, while in haemorrhage there are obvious dangers in giving it until the condition has been ascertained or is about to be dealt with. Rectal saline is also of little use here, as in severe cases it is not readily absorbed, while there is always the danger of its mechanically harming the abdominal condition, unless a large intestine wound can be obviously excluded.

*Saline during operation.*—In cases whose condition is good or fair we have used subcutaneous saline with Lane's bag extensively; Oi. or Oii. with 1 c.c. of pituitrin, and occasionally 3 i. of adrenalin solution being infused during the operation. It is only right to mention that in two cases this method has been followed by cellulitis. Both were fatal, with gas gangrene of the original wound, and it appears that there was an infection in addition at the site of the saline injection. In neither case was it the cause of death, but it shows the method has its dangers. In more severe cases with haemorrhage we use intravenous saline; Oii. or more are given with brandy 3 ii., adrenalin solution 3 iii., and 1 c.c. of pituitrin. It is given slowly during the course of the operation, about Oss. should be given at once, and the rest withheld until towards the end.

*Saline in the after-treatment.*—Rectal saline by intermittent small enemas 3 v. to 3 x. (with brandy 3 ii. to Oi. to promote absorption) is given as a routine measure for some days. Intravenous saline when a patient collapses after operation is useless, unless the collapse is due to secondary haemorrhage—which hardly ever occurs in abdominal cases.

*Incisions.*—The following are the chief points:—  
1. Where the location of the injury is uncertain and small intestine is almost certainly concerned a long (6-inch)

middle-line incision extending above and below the umbilicus is best. It should be made to one side of, and not through, the linea alba.

2. Where the injury can be localised to one side of the abdomen and there is a likelihood of colon being affected, either a vertical incision through the rectus sheath should be used (as has been done most frequently by us) or a transverse incision through the oblique muscles and extending into the rectus sheath (that muscle being pulled inwards) may be adopted.

3. Where injury to the flexures of the colon or the spleen is suspected a paracostal incision through the muscles, if necessary extended in the same way into the rectus sheath, has been frequently done, gives good exposure and heals well.

4. Sometimes where a primary lumbar incision has been made to deal with a wounded kidney and the missile not being found the immunity of the peritoneal contents is doubted, it is useful to remember that the peritoneum can be opened and often explored, sufficiently at least to establish the point, through the lumbar region.

Whenever possible the incision should be made separate from the original wound (in the case of large wounds only is this impracticable as a rule) and closed completely to obtain first-intention healing, drainage-tubes being inserted through separate button-hole incisions. Often the original wound can be utilised for a drainage-tube. It is wise to excise the skin around the original wound and to cleanse and drain with care large ramifying wounds in the abdominal wall. Gas gangrene does occur in these cases and is very fatal. On the other hand, with a separate operation wound it is surprising what good first-intention healing is usually obtained despite sepsis elsewhere.

*Closing the wound.*—The greatest possible care should be devoted to this. It is a point upon which we would lay most especial emphasis. A disconcertingly large number of these wounds have given way, often a fortnight after operation. Do not allow any consideration of time to prevent a careful closure in layers. The patient can be allowed to come round from the anaesthetic directly the peritoneum is closed and it is not this part of the operation which gives rise to shock.

We have abandoned entirely the use of a single row of deep sutures except in the most desperate cases, but use deep sutures in addition frequently. They should be of very strong silkworm-gut, set well back from the edge of the wound and not tied too tight, while they should not be removed till the twelfth day. In practically all cases the abdominal wall should be carefully sutured in layers. We generally use chromic gut, but silk is safer for the peritoneum.

The subject of importance of care in this matter may seem to be laboured, but when it is realised that the incisions are larger and owing to frequent bronchitis and paralytic distension the sutures are subject to a greater strain than is ever the case in civilian abdominal surgery, it will be understood that this is a point where technique is specially to be considered, and that even where everything possible has been done disasters will occur which will suddenly impose upon the patient a second operation and may imperil his chances of recovery. Of course, the danger is chiefly from middle-line incisions in the lower abdomen, but unfortunately these cannot be avoided in many cases.

#### *Examination of Abdominal Contents.*

In those cases where the damaged area cannot be localised—either by the existence of a through-and-through wound or the finding of the missile—a more or less complete examination of the abdomen is necessary. Both to save time and shock it is desirable that this should be done in an orderly routine way. Even then it occupies a large fraction of the total time for the operation.

Several surgeons engaged in this work examine the small intestine first and deal with it before turning to the other injuries. We prefer to examine the whole injured area, and when possible find or trace the missile before starting any repairs. There is one trifling advantage in this, and that is that in a desperate case which has been undertaken as a forlorn hope it may be found that, for example, suture of the stomach, colostomy, and a double resection of a small intestine would be necessary, it being manifest that the man will die on the table if this is attempted; the abdomen is closed and

the patient sent back to the ward as inoperable, morphia being given at intervals until death occurs. If the method of dealing first with the small intestine is used, the surgeon will be led to a procedure which involves a death on the table and wastes time when several patients may be waiting. There is one exception to the rule, and that is where a leaking large intestine wound is disclosed at once. It should, of course, be cleaned and repaired forthwith to avoid contamination during the subsequent examination.

We conduct the routine examination as follows. When the middle-line incision usual in such cases is used, the cæcum is first felt and seen if possible, then the termination of the ileum is identified, and the small intestine brought out and examined in short lengths of a foot or so, the uninjured gut being rapidly returned by the assistant. The advantage of beginning with the ileum is that wounds are rather more frequent than in the jejunum. When a rent is discovered, the wounded portion is retained outside the abdomen, the position of the first rent or hole being marked by a light clamp or otherwise. If a large portion has to be kept out in this way, it is, of course, covered by hot towels with saline. The small intestines being examined, the transverse colon and sigmoid may be largely seen, while the flexures, rectum, and bladder have to be felt, but it is surprising how readily a hole or tear can be detected in this way. In some cases the missile will be found loose in the pouch of Douglas, and it should always be looked for at this site if not found elsewhere.

#### *Wounds of Upper Viscera.*

In cases where the upper viscera are wounded the following points should be borne in mind.

*Stomach wounds.*—The stomach may be distended and yet a considerable hole or tear be present. If one hole only is found a second should always be looked for unless the missile is found in the stomach.

*Liver wounds.*—As has been said elsewhere, we do not operate on a case where this is the only lesion. If the wound in the liver is small and not bleeding it should be left alone. If large and inclined to bleed it may be packed. Suture is seldom possible, though it has been done successfully by one of us.

*Spleen wounds.*—If very small and not bleeding they may be neglected, but bleeding is usually going on or is at once started by manipulation. Moderate-sized tears are sutured or packed. Suture is easier than in the liver. We have reserved splenectomy for the most serious cases.

*Kidney wounds.*—It is as well to remember that although many kidney wounds can be detected by palpation through the peritoneum if the abdomen is open, yet there may be serious laceration concealed by a haematoma. In all cases where a kidney, as well as the abdominal contents, was affected, we have dealt with the kidney through a separate lumbar incision. It is seldom possible to diagnose the extent of its injury otherwise, and for this reason one is never tempted to try a transperitoneal nephrectomy to save a second incision. As to whether to suture, pack, or remove the kidney, we have only done the latter where the tear extended right across the hilum and haemorrhage was going on. In several cases an isolated portion of cortex of considerable size has been removed and the large gap sutured together with successful results.

#### *Wounds of Intestines and Bladder.*

As to the remaining viscera—intestines and bladder—the following are the results of our experience as regards technique.

*Small intestine.*—Where the holes are small a single row of Lembert's sutures or a purse-string is all that is necessary; double suture is only necessary for large tears which might bleed.

*Resections.*—The mortality of resection is nearly double that of simple suture, consequently wherever possible suture should be employed and resection should seldom be undertaken merely to save time. We have resected as much as 7½ feet successfully, and, curiously enough, these large resections seem to recover as well as much less extensive ones. It is as well to remember in such cases, where time is of particular value, that very large loops of mesentery may be taken up in each ligature if it be of stout silk and carefully tied.

We have generally done end-to-end anastomosis. Lateral anastomosis has been recommended strongly as giving

greater freedom from paralytic distension and obstructive symptoms afterwards. One of us has tried it in a number of cases. In our opinion there was nothing in the result to justify us in giving it any preference, and there is no doubt that it takes at least a quarter of an hour longer. In many very bad cases the end-to-end anastomosis has necessarily been done very hurriedly, but we have had no single case in which post-mortem examination failed to show a satisfactory union. Time should not be wasted in over-elaborate stitching in these anastomoses—we have seen a sufficient number to say with some confidence that the "leak" at the mesenteric attachment is a surgical "bogey."

Again, with a view to avoiding the effects of the supposed paralysis at the site of anastomosis or suture it has been suggested that where practicable the injured and repaired gut should be short-circuited. We have not done this, as our experience from post-mortem examination is that the paralysis is general, the result of peritonitis, and not limited to the injured area. Moreover, when account is taken of the fact that they are more serious cases, it is not more frequently associated with anastomosis than suture.

*Large intestine wounds.*—These are nearly twice as fatal as those of the small gut. Moreover, after their suture faecal fistula is only too frequent. The greatest care should be given to the suturing which, of course, is much more difficult than the small intestine; a double row of sutures should invariably be used and the gut should be carefully cleansed with antisepsics after the first is inserted. In addition a piece of omentum may be stitched over the repair. It may be necessary to make a separate "gridiron" incision in the flank to deal satisfactorily with ascending or descending colon wounds.

An important question which often arises is, Should one do a colostomy or not? When time is valuable and suture difficult one is tempted to bring the injured gut to the surface with or without a Paul's tube. Our advice is, never do so if suture can possibly be undertaken. The operation is a totally different one from a "civilian" colostomy, in which the gut is either left unopened or a Paul's tube firmly tied in at the highest point. In these cases there is already severe peritoneal infection and it is never possible to get a Paul's tube in really satisfactorily, so that the colostomy acts as a continual source of infection. Even if faecal fistula is inevitable, suture, when it can be done, closes the source of infection for some time. It will be seen how high the mortality of our colostomies has been, and we now regard it entirely as an operation of pure necessity where suture is impossible.

*Wounds of the bladder.*—Where there is an intraperitoneal wound only and this can be sutured, is it safe to do this without drainage of the bladder? We consider that it is, and have found that the result is just as satisfactory when the bladder is completely closed as when it is drained supravaginally. A catheter should be tied in, and, of course, in all bladder cases the pouch of Douglas is drained. Cases in which the missile has passed through the buttock and there is an extraperitoneal bladder wound which cannot be sutured are, like most buttock wounds, specially serious. The buttock is, of course, thoroughly drained, and, in addition, a tube can often be inserted outside the peritoneum and down into the space at the side of the bladder close to the wound in that organ. When such cases can be efficiently drained in this way they do well as a rule. In all wounds of the urinary tract hexamidine should be given from the start of the treatment until all danger of sepsis is past.

*Drainage of the abdomen after operation.*—In every case where there has been escape of visceral contents we drain the pouch of Douglas. In cases where there has been no escape of contents, and, for example, a foreign body has been removed from the peritoneum only, a local drain is quite sufficient; we have found it inadvisable to disengage with it, though this has been done quite successfully. When a drainage-tube is near or in contact with a sutured large intestine wound it should be removed on the second day, as it may encourage a faecal fistula. Speaking generally, we find it quite unnecessary to retain any drainage-tubes for long—their purpose is served once a channel is formed.

#### After-treatment.

The subject of salines here has already been dealt with. Fowler's position is, of course, the rule. One of the most

disappointing phenomena in these cases is the occurrence of a rapid collapse 12 to 24 hours after operation in a patient who has apparently rallied well from the primary shock. It is hardly likely that the condition is due to toxæmia from incipient peritonitis, and post mortem nothing has been found to account for it. The condition is best described as "secondary shock," but while it accounts for many deaths, is not easily explained or treated. Intravenous saline is useless; stimulants (strychnine and brandy) appear sometimes to have accounted for a second rally.

It is possible that the collapse represents the result of operating on a patient with too great a degree of primary shock—it is certain that it occurs in those with most well-marked shock at first—but since in so many patients of this class the chances without operation are almost nil, this view does not help one much. We believe, however, that secondary shock can be prevented, to some extent, by a short delay to warm and rest patients who come in a bad condition.

Most patients vomit at intervals on the day after operation and, speaking generally, these patients are more troubled by vomiting than "civilian" acute abdominal cases. Fluid should be resolutely withheld, despite the intense thirst, when this vomiting shows no sign of ceasing early; often 12 hours without anything by the mouth will stop it. In some such cases there is acute distension of the stomach, and where this is unmistakable a stomach tube has cured the condition, but it should not be used in a collapsed patient.

The rest of the after-treatment is devoted to aiding the patient's combat with his peritoneal infection, and while almost every one has, presumably, some degree of peritonitis it is surprising how comparatively infrequent ordinary general peritonitis is. The chief danger to a man shot in the abdomen when he can be operated on in reasonable time is not peritonitis, but shock and haemorrhage. If these two could be entirely eliminated, it is safe to say that the total mortality would be reduced by 30 or 40 per cent.

The chief symptoms from supervening peritonitis are paralytic distension, vomiting, and constipation. There is, of course, a primary paralysis of the intestine after the wound, and in cases with little peritonitis this passes off in the first 24 hours. When, however, the paralysis due to peritonitis is superadded we get an exaggeration of these symptoms which in bad cases passes on in time to real obstruction. Fortunately, many cases stop short of this and yield to medical treatment.

As a prophylactic one of us gives hypodermic pituitrin, followed in half an hour by an enema on the day after operation. All of us agree as to the importance of getting the bowels open upon the third day if possible. When obstructive symptoms with paralytic distension threaten, one of the most valuable drugs is hypodermic eserine, gr.  $\frac{1}{15}$ , being given every two hours. Small doses of calomel, hypodermic pituitrin, and turpentine enemas are also used.

In cases where this fails and real obstructive symptoms come on, post-mortem examination usually reveals a condition of general peritonitis, with pockets of pus, adhesions, and often multiple kinks. The patients are usually desperately ill by the time such a condition is established, and the chance of doing anything by operation is not hopeful. Perhaps the best plan is to open up the wound and to search gently with the finger for any collection of pus, separating any adhesions close to the wound; this can sometimes be done without an anaesthetic, and we have had more than one case in which it appeared to save life, but, unfortunately, many more in which it failed. It has been suggested that a distended coil of gut should be drained by suturing in a small tube; we have tried this so far unsuccessfully, and the fact that points of obstruction are so often multiple does not render it very hopeful.

Tubes, as has been said, are removed early. Where gauze packing is used—in a liver or spleen—it is wisest to leave it alone for four days, and then if difficulty is encountered an anaesthetic is often avoided by removing it by stages.

Lastly, we would emphasise the fact, which experience has shown, that these patients are often a good deal upset by the journey to the base, and on no account should a patient be sent earlier than can be avoided or before the end of a week, however well he is. Most of our patients leave for the base in between 10 days and a fortnight.

TABLE I.—Mortality Results of First 500 Operations.  
Total: 245 lived, 255 died. Recovery-rate, 49 per cent.

Class.	Nature of visceral injury.	Total No.	Result.		Recovery rate, per cent.
			Lived.	Died.	
1	Stomach—No other injury .. .. .. .. ..	9	6	3	66·6
	" All stomach wounds .. .. .. .. ..	23	8	15	34·7
2	Small intestine—Sutured; no other injury ..	64	40	24	62·5
	" " all cases .. .. .. .. ..	96	53	43	52·2
	" " Resections alone .. .. .. .. ..	58	18	40	31·0
	" " " all cases .. .. .. .. ..	90	26	64	23·8
3	Large intestine—Sutured; no other injury ..	45	21	24	48·8
	" " all cases .. .. .. .. ..	119	43	76	38·1
	" " Colostomy .. .. .. .. ..	13	2	11	15·3
4	Liver—Pure liver wounds .. .. .. .. ..	27	13	14	48·1
	" All .. .. .. .. ..	58	19	39	32·7
5	Spleen—No other injury .. .. .. .. ..	11	6	5	54·5
	" All cases .. .. .. .. ..	17	8	9	47·0
6	Kidney—Pure kidney wounds .. .. .. .. ..	10	6	4	60·0
	" All cases .. .. .. .. ..	20	12	8	60·0
	" Nephrectomies .. .. .. .. ..	2	2	0	100·0
7	Bladder—Pure bladder wounds .. .. .. .. ..	9	5	4	55·5
	" All bladder cases .. .. .. .. ..	25	12	13	48·0
8	Rectum—Alone .. .. .. .. ..	3	2	1	66·6
	" All cases .. .. .. .. ..	9	5	4	55·5
9	Laparotomy—(a) With no injury found .. .. ..	57	53	4	92·9
	(b) Retropertitoneal haematomata only .. .. ..	23	9	14	39·13
	(c) Bruising of intestine and haemorrhage .. .. ..	9	7	2	77·7
10	Cases in which peritoneum was opened by original wound but no visceral injury .. .. .. .. ..	10	6	4	60·0
11	Cases with protrusion of intestine† .. .. .. .. ..	16	6	10	37·5
	" " " " uninjured .. .. .. .. ..	5	3	2	60·0
12	Wounds of chest and abdomen‡ .. .. .. .. ..	27	5	22	18·5
13	Gas gangrene of abdominal wall .. .. .. .. ..	11	1	10	9·0

\* All these cases had other wounds. None died from operation.

† Included in some cases under small intestine.

‡ These cases had wound of lung. All that recovered had only solid viscera injured in the abdomen.

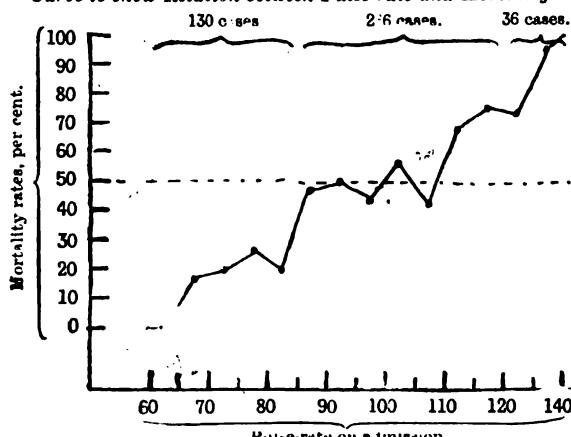
TABLE II.—Regional Mortality of 467 Cases.

	Lived.	Died.
Anterior abdominal wall .. .. .. .. ..	96	97
Flank or loin { Right .. .. .. .. ..	28	20
Left .. .. .. .. ..	34	29
Chest * { Right .. .. .. .. ..	26	25
Left .. .. .. .. ..	25	20
Buttock (either side) .. .. .. .. ..	18	49

\* I.e., wound above rib margin—not only wounds of lung, for mortality of which see Table I.

N.B.—In this table where there are through wounds with exit and entry in different regions the case is classified in the category standing lowest in above scale—i.e., "Anterior abdominal wall and buttock"—under "Buttock."

Curve to show Relation between Pulse-rate and Mortality.



Note on the foregoing Tables and Chart.

Table I.—The whole paper forms a commentary on this table. Note especially the high mortality of colostomy,

retroperitoneal haematomas, gas gangrene of abdominal wall, and wounds of lung and abdomen. It is especially significant that our only recoveries in the latter cases were wounds of solid viscera where expectant treatment might have sufficed.

Table II.—Here the cases are classified according to region wounded. The chief value of this lies in bringing out the high mortality of buttock wounds. Many of these cases had slight visceral injuries. Death is due to haemorrhage and sepsis in the buttock and to pelvic cellulitis. Wounds of loin and flank and chest wall include most of the solid viscera wounds and most where nothing was found on operation, hence their mortality below the average.

Pulse chart.—This shows very clearly that when the pulse is between 85 and 110 the prognosis is that of the average—about 50 per cent—and there is little to choose between these rates. Below 85 prognosis is very good and above 110 very bad. In preparing this table it was noticeable that most fatal cases with low pulse-rate were buttock cases or died of other wounds.

#### Conclusion.

All statistics are full of fallacies, and none more so than the mortality rates of different series of these cases. As will be seen, wounds of a single viscera are in a small minority. Cases comparable as regards the abdominal condition are often differentiated entirely by some severe complication in the nature of a wound elsewhere. Comparatively slight abdominal cases develop perhaps gas gangrene or bronchitis and pneumonia, while the most serious may, in contrast, have no other wound and every condition in his favour. Mental shock and exhaustion and fear are noticeable factors in a patient's course, and at one time we had a number of cases who had been in addition poisoned to varying degrees by gas shells.

Any attempt at exact statistical comparisons will require an enormous series of cases. All one can say at present is that if large numbers are taken about half survive after operation. The mortality of all cases is a much more difficult matter, since in those which recover without operation it is often impossible to say whether the abdominal cavity was penetrated or not.

In the heavy work with the main Somme fighting we kept no careful notes of these, and so we refrain from publishing figures which might be misleading, but we would state emphatically from the consideration of a small series recently worked out carefully with the aid of a sectional atlas that there have been many recoveries from wounds of the hollow viscera without operation.

We have made no attempt to present the individual cases appertaining to each of us separately; but, as a matter of fact, the mortality rate of each operator's series works out at very nearly the same figure. It is essentially in the diagnosis and selection of these cases rather than in the technique of operating that experience is of such value, and it is here that one feels that one continues to make definite progress as it increases.

Not many series of abdominal cases have as yet been published, and none that we are aware of so large as this, and we would emphasize the futility of attempting comparisons of small series as to "results." In each of our individual series a portion of 30 or 40 consecutive cases can be picked out which shows either an extremely low or an appallingly high mortality. It has happened to one of us to get a dozen consecutive cases which have lived, and to another as many in succession that have died. Two surgeons of equal merit and experience may differ in the extent to which they will go in operating upon the "forlorn hope" type of case—a difference which will show itself in statistics.

So that our final word on statistics is that no surgeon should let himself be troubled by them or allow any consideration for them to influence his judgment in an individual case. The vast majority of the patients who die, die in the first 24 hours from shock and haemorrhage. There is only one really outstanding problem in the matter, and that is the enormously difficult one of the nature and treatment of shock. Its solution, which can hardly be expected in this war, will alone make any dramatic and striking difference in the death rate of these cases.

The last point to touch on is as to the fate of the cases who leave us for the base and are marked "lived" in these tables. Owing to a system in use since July we send each patient down with a card, which is returned to us from the base with an account of him, while later we hear from

England as to the final result. Sufficient of these returns are not yet in to include them in our table, but we can say confidently that the number who die after they leave us is very small, certainly well under 5 per cent., while we already know of several who are fit for duty.

Taking it upon the whole, recovery, if death does not take place in the first few days, is better after these abdominal wounds than after the severest type of head, chest, or limb wounds. It is likely that some of our patients will have some lengthy disorders of digestion or nutrition. Cases of large resections seem especially likely to do so; one imagines that adhesions and ventral hernia will frequently require attention for some time to come.

In final conclusion we apologise for shortcomings in the writing of this paper by pointing out that it has been written and the facts and statistics collected in short intervals of leisure "in the field."

## A Lecture ON THE TREATMENT OF SECONDARY HÆMORRHAGE, WITH SPECIAL REFERENCE TO GUNSHOT WOUNDS.

*Delivered in the University of Bristol in the Autumn Session, 1916,*

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GENTLEMEN.—In surgical practice in civil life secondary haemorrhage is of rare occurrence, but in connexion with the large number of suppurating gunshot wounds with which we have to deal at the present time it is quite common, and as it is necessary to have a very clear idea in our mind as to how a case, which may be one of extreme urgency, should be treated, it is worth while considering the subject at some length.

### THE NATURE OF THE HÆMORRHAGE.

Secondary haemorrhage is always due to a failure by nature to occlude permanently an injured vessel, and in the great majority of cases an injured artery. It does not usually occur before the second week after the injury, but may occur earlier. I have had a case myself of secondary haemorrhage from the anterior tibial artery in a suppurating compound fracture as early as the fourth day. It must be clearly distinguished from what is called reactionary or recurrent haemorrhage, which occurs some hours after an injury or operation, and may be due to increased force of the circulation restarting the haemorrhage or to slipping of a ligature. Secondary haemorrhage almost always occurs in suppurating wounds; a great number of such wounds, complicated by the occurrence of secondary haemorrhage, at the military hospital are compound fractures.

In order that you may understand how best to deal with it, it is very important that you should have a clear idea of its nature. It may start as quite an insignificant bleeding. Perhaps the nurse may tell you that when she removed the dressing she found a few clots of blood in it, but that the bleeding had quite ceased. Now if a large artery is known to have been injured, or even if the wound track runs in the neighbourhood of a large artery, this is a very serious occurrence. You must always impress on nurses that they should at once report any bleeding from a wound, however trivial it may seem. With no more bleeding than this I have opened up a suppurating gunshot wound of the leg and found an opening in the posterior tibial artery. If once secondary haemorrhage has occurred from an injured artery it is almost certain to recur, and any recurrence may be so severe as to be fatal.

It may be well to consider what may cause bleeding from a wound, in the second week, besides injury of an artery. Of course, if granulation tissue, which is very vascular, is probed or otherwise injured, it will probably bleed; but, apart from any injury, it is stated in some of the text-

books that granulation tissue may bleed, and what is described as "parenchymatous oozing" is said to occur from sloughing wounds, and to be apt to recur, and ultimately to prove fatal. I have had one case of suppurating compound fracture in which bleeding took place twice within 24 hours, and as the wound was close to a main artery I opened it up and found it full of clot. But I could not find any bleeding vessel, only small areas of bleeding granulation tissue, and after cleaning out the wound I packed it with gauze saturated with turpentine, as advocated by Mr. Grey Turner, of Newcastle,<sup>1</sup> and no recurrence of the haemorrhage took place.

In another case in which there had been recurrent attacks of haemorrhage for a fortnight before I saw the patient and he had become quite anaemic, when I opened up the wound, which was close to the popliteal space, the only bleeding vessel I could find was a venous branch. This I tied, and there was no further bleeding. In a case of very smart secondary haemorrhage from a gunshot wound of the calf, in which from the position of the wound track one of the main arteries of the leg might have been wounded, I found the bleeding was from an arterial muscular branch.

### TREATMENT OF SECONDARY HÆMORRHAGE FROM A VESSEL IN CONTINUITY.

I will first describe how I think secondary haemorrhage should be treated, and then refer to the recommendations of other surgeons as to other methods, and I will consider first secondary haemorrhage from a vessel in continuity, and later secondary haemorrhage from stumps. You must clearly recognise that even if the bleeding has ceased, and however slight it may have been, something must be done if it is known that a main artery is injured, or even if from the proximity of the wound to such a vessel it seems probable that it is, and I think the only really safe way of dealing with such a condition is, as soon as possible, to cut down on the bleeding vessel and tie it. I say as soon as possible, because although the first haemorrhage may be quite slight a second may be fatal, and this may come on at any time.<sup>2</sup>

You will remember that in dealing with primary haemorrhage it is always wise to tie at the bleeding spot, and to tie both ends of a divided artery. Proximal ligation is not to be recommended, for it may not be the main artery which is wounded but only a branch, and it would not therefore be necessary to tie the main artery at all, and if you perform proximal ligation as soon as the collateral circulation begins to form blood is brought to the distal end and haemorrhage may recur; a d, moreover, if you tie the vessel some distance above the point where it will be occluded in the wound, you get a double block in the artery, and, in the lower limb at any rate, run a risk of causing gangrene. For these reasons you should whenever possible open up the wound track and find the bleeding vessel and tie it, and, as in the case of primary hemorrhage, you should always tie an artery both below as well as above the opening into it to prevent bleeding from the distal end when the collateral circulation becomes established. You will not always find the bleeding is from a main artery, as I have already said, but the chances are so great that it will be from such a source if the wound track runs in the neighbourhood of a large artery, that it is certainly wise to act as if we knew the bleeding came from a main artery.

But there are a few situations in which you cannot reach the artery, and sometimes when you open up the wound the bleeding artery is surrounded by such sloughy tissue no ligature would hold. In such circumstances you are obliged to perform proximal ligation. I have had to ligature the external carotid for secondary haemorrhage from a branch of the internal maxillary artery. But proximal ligation is to be avoided if you tie at the bleeding spot. It may be much easier to perform proximal ligation than to tie at the bleeding spot in a deep wound, but it is not good surgery. I have just stated that the wound may be too sloughy to tie the artery at the seat of bleeding. But you must recognise that the vessel may be surrounded by soft granulation tissue, and

<sup>1</sup> THE LANCET, 1915, II., 226.

<sup>2</sup> Sir G. R. Makins (British Journal of Surgery, January, 1916, p. 347) has pointed out that in cases of traumatic aneurysm, if slight bleeding occurs from the external wound during the first few days after the wound is inflicted, no operative measures are required, for this slight and early haemorrhage may be simply an escape of blood from what he calls the "arterial hematoma."

it may not appear possible to tie it at the bleeding spot, and yet if you scrape away the soft tissue with the blunt end of the scalpel you may find that you can expose the artery where it will take a ligature. In some cases a ligature may be passed around the artery and the surrounding soft tissues, or we may be able to catch the bleeding vessel together with some of the surrounding soft tissue in pressure forceps, and leave them on for 24 or 48 hours.

But having found and tied the bleeding vessel, we must do more than that—we must take measures to try to get the wound less septic, or secondary haemorrhage may even recur at the seat of ligature. At the time of ligation we must well clean out our wound with swabs, cut away all sloughs, and then apply for a very definite period of time (just douching the wound is not enough) a strong antiseptic such as eusol. But it would be much better to apply the antiseptic continuously for some days, either by constant irrigation or by Carrel's method.

#### *Immediate Treatment.*

I must now say something about the immediate treatment of secondary haemorrhage—what we may call first-aid treatment. Every military surgical ward should have a rubber tube tourniquet readily available, and the nurse or orderly should be instructed how to make a tourniquet out of something certain to be at hand if the actual tourniquet was not, and they should also be instructed that it must be put on tight enough to occlude the arteries and not so as merely to cause venous congestion, and so increase rather than stop the haemorrhage. If the haemorrhage was not very great it would be better for the nurse or orderly to call medical aid, so that the tourniquet might with greater certainty be applied effectually.

If operation cannot at once be performed the patient should have a hypodermic injection of morphia, for the pressure of the tourniquet round the limb may cause much distress. It should be left on until the patient is under the anaesthetic and the wound opened up; then it should be released, but only so that, if necessary, it can be instantly reapplied. When it is released the vessel will very likely bleed and can be secured, but it may not; but even then we may find an opening into an artery by careful search in the wound. We may perhaps start the bleeding by rubbing over the wound surface with a swab and so detach some clot which is temporarily stopping the opening in the vessel. If we cannot find any injured vessel we shall have to be content with very firm packing of the wound with gauze saturated with turpentine and watch the case with great care for any recurrence of the bleeding. If serious bleeding did recur and a second attempt to find the bleeding vessel failed I suppose we should have to resort to proximal ligation of the main artery supplying the region of the wound.

#### *Secondary Haemorrhage Not Controllable by Pressure on Proximal Vessel: Groin and Gluteal Region.*

But there are some regions in which secondary haemorrhage from a large artery may take place, but the haemorrhage cannot be controlled by a tourniquet or even by digital pressure on a proximal main artery. The root of the neck, the groin, and the gluteal region are such areas.<sup>3</sup> In these regions immediate pressure in the wound must be made, and all nurses employed in military surgical wards should be instructed how to employ it. The wound or wounds from which the haemorrhage comes must be tightly packed with gauze, as far as it is possible to get a gauze plug into some of these gunshot-wound tracks, and digital pressure kept up on the gauze plug where it projects from the wound until the haemorrhage has ceased, or if it can only be controlled by keeping up such pressure, it must be kept up until the patient is under the anaesthetic and the surgeon is ready to open up the wound.

In the case of the groin or gluteal region, if the haemorrhage has been severe it is a question whether it will be safe to remove the plug without first obtaining control over the main supplying artery. For when we remove the plug the haemorrhage may again be severe, and no tourniquet can be applied to control it while we search for the injured vessel. It seems to me that we should make the attempt—i.e., we

should remove the plug and see if violent haemorrhage will recur. If it does not, we can safely open up the wound and search for the bleeding vessel. If it does, it would be almost impossible to do so in a deep wound converted into a pool of blood, and we should have to plug again at once. We must then ligate the main artery through the abdomen, the external iliac in the case of a groin wound, and the internal iliac in the case of a gluteal wound. An alternative method would be the application of Crile's clamp to the artery, so that it would not be permanently occluded at this spot, but the objection to this method would be that we should have again to open the abdomen to remove it after dealing with the septic wound. But there would be no risk in doing this if adequate precautions were taken in changing gloves, towels, &c., and resterilising instruments, and it would be a great advantage to avoid the risk to the circulation of the limb of proximal ligation.

Having thus controlled the main vessel we should, after closing the abdominal wound and applying an aseptic dressing to it and covering this over with some waterproof material, then search for the bleeding vessel in the gunshot wound and tie it there. We should not be content with proximal ligation, which has really only been used as a substitute for the application of a tourniquet, because the bleeding may recur from the distal end of the injured artery if we do not tie it at the bleeding spot and tie both ends.

#### *The Root of the Neck.*

In the neck, of course, haemorrhage can be controlled from the external or internal carotid, or the region of the bifurcation of the carotid, by digital pressure on the common carotid, but we may have to deal with secondary haemorrhage at the root of the neck. If it has not ceased when we operate it must be controlled by digital pressure in the wound. There would be no room for a gauze plug because we have to control the proximal artery so close to the bleeding spot. In secondary haemorrhage from the third part of the subclavian we might be able to tie the first part without resection of the clavicle, but when the haemorrhage is from a vessel on the inside of the scalenus anticus it might be necessary to resect the inner part of the clavicle so as to get at the artery on the proximal side in order to control the circulation in it while we dealt with the bleeding spot in the vessel; for if the bleeding had not ceased at the time of the operation but had to be controlled by digital pressure in the wound, if the bleeding vessel were a main artery it would only be possible to tie it after control of the proximal trunk. If the bleeding was coming from the thyroid axis or one of its branches or the vertebral artery it might be possible to pick it up and tie it, after a free exposure of the area. But after digital pressure had been removed I do not think hemorrhage from a main artery could be effectively dealt with until the proximal vessel was controlled.<sup>4</sup>

Of course, in some desperate cases, as in wounds in a region, space is so limited for access to the vessels, and with the parts infiltrated with blood and perhaps sloughing, it may be that the only thing we may be able to do is to maintain firm plug pressure. In making such pressure I would suggest that an elastic bandage should be carried over the root of the neck and under the axilla of the opposite side, and then

<sup>4</sup> In some of these desperate cases of secondary haemorrhage on the inner side of the root of the neck, or if a large vein were wounded behind the inner end of the clavicle in the removal of malignant glands in this situation, it has seemed to me that removal of the inner end of the first rib, together with the corner of the sternum to which it is attached (as well as the inner end of the clavicle), might enable the surgeon to secure the bleeding vessel when it would not otherwise be possible. But this procedure would involve a risk of wounding the internal mammary artery which lies just behind the cartilage of the first rib. The best plan would be, after removal of the inner end of the clavicle, to catch the artery in forceps as it was passing downwards to lie behind the cartilage of the first rib. It would be necessary also to protect the structure lying beneath this corner of the sternum and the inner end of the first rib with a metal spatula when dividing the bone, and it would be necessary not only to detach the sterno-mastoid and pectoralis major from the front but the sterno-hyoid and thyroid would have to be separated from the posterior aspect of the corner of the sternum. A very interesting case of ligation of the first part of the subclavian artery for secondary haemorrhage is recorded by Victor Bonney (Brit. Med. Jour., 1916, 1, 754). He was able to tie the artery at its junction with the innominate artery after resection of the inner end of the clavicle by making traction on it, and he advocates such traction as a means of reaching these deep vessels. He says in his case, as in others, the upper end of the innominate artery and the root of the subclavian lay well behind the manubrium sterni. Fortunately, in his case bleeding had ceased before the operation was performed.

<sup>3</sup> I have not included the axilla with the regions referred to, because it would be possible to control the third part of the subclavian artery by digital pressure, but it would be much safer to expose it, and apply to it a Crile's clamp.

the axillary loop should be kept well down in the axilla by a bandage carried through it and round the perineum.

*Conditions Found on Operating.*

It may be interesting to consider exactly what conditions we are likely to find when we open up the wound to deal with the bleeding. In nearly all my cases the hæmorrhage was found to be coming from a wholly or partly divided artery, and in most cases a main artery, though in one case it was from the peroneal in the lower part of the leg, and in another from only a muscular branch, though in this case the hemorrhage was quite smart. I have already referred to a case in which the hæmorrhage had been recurring at frequent intervals for a fortnight and the patient had become seriously anaemic before I saw him, yet the hemorrhage was only from a vein and it was quite stopped by its ligation. These three cases well illustrate how unwise it would be to tie the main vessel on the proximal side. If I had done so I should have tied the popliteal artery in one of the cases and the superficial femoral in another without any need.

My experience in these military cases has taught me the interesting fact that an artery such as the ulnar or posterior tibial may be very freely opened in a gunshot wound and may be found open and bleeding as late as the fourteenth day, and yet except for some hemorrhage at the time of the injury no hæmorrhage has occurred until the fourteenth day. It seems likely that the opening in the vessel is plugged by clot, and that eventually that clot is disturbed or dissolved, but there is no apparent reason why this should take place at the particular period when it does. The hæmorrhage in these cases is not associated with movement of or by the patient. And another interesting question is, Why does the bleeding spontaneously cease, as it certainly may, even if severe? You may open up the wound and find a considerable-sized opening or a complete division of the artery, and yet the hæmorrhage, which may have been severe, has ceased. Of course, when a patient becomes collapsed from loss of blood hæmorrhage very often ceases, but this condition was not present in the cases I refer to.

I should like again to call your attention to the fact that sometimes you may get marked hæmorrhage from a suppurating gunshot track in the neighbourhood of a large artery, and yet when you open up the wound, though you find it full of clot, you may fail to find, even after the most thorough search, a definite bleeding vessel, but the blood is coming from certain areas of granulation tissue. I had such an experience in the case of gunshot fracture of the upper end of the humerus (and I have already briefly referred to the case), where the wound track ran close to the brachial artery, and when it was opened up it was found full of clot. The best plan in such a case is to clean out the wound, and then to pack it tightly with gauze saturated with turpentine.<sup>5</sup> This may stop such hemorrhage.

In some cases in which you have to operate for secondary hæmorrhage you may find the opening in the artery communicates with a collection of old clot in a cavity in the tissues (a traumatic aneurysm) and yet there is an external wound, and through that wound hæmorrhage may occur as late as the fourteenth day. I have met with this condition in connexion with a gunshot wound of the posterior tibial artery; and in the case of a boy I operated on in civil practice frequently recurring hæmorrhage took place from a punctured wound of the sole of the foot. At the operation I found a cavity in the tissues containing old firm clot, and with this, through a minute puncture, the external plantar artery communicated. Recurrent bleeding took place through a sinus in the sole as late as a month after the injury. In another case in which I had to operate for secondary hæmorrhage (also in civil practice), associated with a septic compound fracture of the tibia, I found a small aneurysmal sac, almost the size of a pea, on the anterior tibial artery, and this sac had perforated. Its wall was white and very soft, and evidently due to septic change in the vessel wall. The hemorrhage occurred as early as four days after the injury.

*Other Methods of Treatment.*

I have described the method of treatment which I think should be adopted in cases of secondary hæmorrhage, but I should like to call attention to other methods which are advocated. One method which is recommended in one of the text-books of surgery is plugging the wound. It is said

that if the hæmorrhage is not severe and does not come from a large artery, it may be treated by packing the wound firmly with gauze. But how are we to know that it does not come from a large artery if the wound track is anywhere in the neighbourhood of one, and even if the more superficial part of the wound track is not near a large artery yet such tracks are often very long and complicated and may extend much farther than we may think. No doubt in many cases in which we can pack the whole wound with gauze, especially if it is wrung out of turpentine, this may stop the hæmorrhage, but there is danger of a very serious or even fatal recurrence of the hæmorrhage if a large artery has been wounded. But in many, probably in most, cases of secondary hæmorrhage in gunshot wounds the wound is not an open wound that can be packed to the bottom. I do not think in any of my own cases of secondary hæmorrhage the hæmorrhage could have been treated by packing the wound with gauze without first freely opening it up. I think all wounds complicated by secondary hæmorrhage I have had to deal with have been deep tracks. And if you have to give the patient an anaesthetic and open up the wound in order to pack it, clearly it would be better to search very thoroughly for a bleeding vessel in order that you may tie it. Even as a temporary measure, whenever it can be done, it would be safer to put on a tourniquet than to plug the wound—i.e., until operation could be performed; but, of course, in those positions in which no tourniquet could be used and the artery cannot be compressed on the proximal side plugging is the only temporary measure we can adopt. And if secondary hæmorrhage occurs in some locality where there is no possibility of performing an operation, such as during transit to hospital, and the wound is in such a position that no tourniquet could be applied, all we can do is to pack the wound with gauze, wrung out of turpentine, if that is available.

Another method of treating secondary hæmorrhage to which I must also refer is the combination of plugging of the wound with compression of the artery on the proximal side for some days by means of a screw tourniquet. But this is almost intolerable to the patient and would require frequent large hypodermic injections of morphia, and after causing much distress to the patient it might not be successful, or if it did prevent recurrence of the bleeding it might cause a thrombus to form in the artery at the seat of compression, and thus a double block in the vessel and in the lower limb, if not in the upper; this would involve a risk of gangrene. Moreover, this painful and somewhat risky process might be unnecessary, for it might not be a wound of the main vessel at all, but only of a branch which might be easily found and tied, if the wound were opened up.

It is sometimes recommended that after one secondary hæmorrhage a screw tourniquet should be applied over the main vessel, and the nurse should be instructed how to screw it down if the hæmorrhage recurs. But who would care to trust to such a method? Very likely, if it did recur, the tourniquet would have slipped off the artery, and the nurse would not know exactly the spot where the artery was lying, and therefore in screwing it down might not control the vessel at all. If this method were adopted the only safe way would be to put an indelible mark on the skin over the artery and instruct the nurse to screw down the tourniquet on that. But it is much safer not to trust to the nurse dealing with what may be a very severe recurrence of the bleeding, but to open up the wound and deal with the bleeding vessel.

**SECONDARY HÆMORRHAGE FROM STUMPS.**

I should like now to consider how secondary hæmorrhage from stumps should be treated. We have the two essential differences between the hæmorrhage from stumps and from an artery wounded in continuity, that in the former the risk of either bleeding from the distal end of the artery, or of gangrene of the limb, is not present, and if we tie the main vessel close to the stump this will stop bleeding from a branch, if it happens to be a branch which is bleeding, as well as from the end of the main vessel, unless that branch should come from the main artery above the seat of ligation. Such proximal ligation must be close to the stump, or we should get blood brought to the injured vessel by the establishment of the collateral circulation between the seat of ligation and the injured vessel.

Proximal ligation has great advantages. In the first place you can make an aseptic wound for your ligature, and in the second place you avoid disturbing the healing process in the stump. We could well treat in this way secondary haemorrhage from a sump in the lower part of the thigh, where the only large artery would be the superficial femoral or the popliteal. In the upper part of the thigh the bleeding might come from either the superficial femoral or the profunda, but if we tied the common femoral we should control both.

In the lower part of the leg the haemorrhage might come from any one of the three main arteries there, and we could hardly tie all three main vessels higher up in the leg, and so we should have to open up the stump and deal with the bleeding vessel there. In the upper part of the leg, however, we might quite well control bleeding from either of the three arteries by tying the popliteal just before its division.

In the upper arm, the only main artery being the brachial, we could well adopt proximal ligation, and in the forearm we could tie either the brachial at the bend of the elbow, or both forearm main arteries, according to the level of the amputation.

### TYPES OF TUBERCLE BACILLI IN CERVICAL AND AXILLARY GLAND TUBERCULOSIS.

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(For the Medical Research Committee.)

In continuation of my work on cervical gland tuberculosis, of which an account was published in THE LANCET in June, 1915, I have examined bacteriologically material from a further series of 52 persons suffering from enlarged cervical or axillary lymphatic glands. This additional material was obtained in order to bring up to 100 the total number of strains of tubercle bacilli isolated by me from cases of cervical gland tuberculosis. The desired number of strains was secured in May, 1916, and the experimental investigations in connexion therewith were completed in October, 1916.

In this communication I propose, first, to state the results obtained from investigation of these 52 new cases, and, finally, to summarise the whole of my observations upon the types of tubercle bacilli found in cervical gland tuberculosis.

For supplying me with the material and clinical particulars of the 52 cases I am much indebted to Colonel C. J. Bond, Leicester; Mr. H. J. Gauvin, Alton; Colonel J. Griffiths, Cambridge; Major R. E. Kelly, Liverpool; Dr. A. H. Miller and Miss M. S. Gordon, Manchester; Mr. F. C. Pybus, Newcastle; and Surgeon R. A. Rankine, R.N. The material has consisted of glands removed by surgical operation and pus aspirated from glandular abscesses or collected on the dressings of discharging neck sinuses. The methods of investigation have been the same as those described in my previous report.\*

The work was carried out in the Pathological Department of the Field Laboratories, University of Cambridge, on behalf of the Medical Research Committee.

#### I. Results of Investigation of Material from 52 Persons Suffering from Enlarged Lymphatic Glands.

##### (A) Cases which gave Negative Results.

The material from 17 of the 52 cases did not produce tuberculosis in guinea-pigs. In 4 of these negative cases the original material was pus or dressings from neck sinuses. In 6 cases the material consisted of enlarged cervical glands, which on section were either hyperplastic or contained purulent foci and were not definitely tuberculous; microscopic examinations and cultivation experiments in these 6 cases were likewise negative. In 7 of the 17 cases the material, enlarged cervical glands, was macroscopically tuberculous. The glands showed on section caseous-calcareous nodules and tubercles, and in 3 of the cases tubercle bacilli were found on microscopical examination. Direct cultures from each material remained sterile.

##### (B) Cases from which Tubercle Bacilli were Isolated in Culture.

The material from 35 cases produced tuberculosis in guinea-pigs and cultures of tubercle bacilli were isolated either directly from the original material or through the guinea-pig. The cultures are divided into three groups, composed respectively of (1) standard bovine, (2) standard human, and (3) atypical strains. The results obtained with each group of cultures are described separately. The clinical particulars and the result of the bacteriological examination of each of the 35 cases are set out in Table II.

##### (1) Standard Bovine Strains.

From 15 of the 35 cases cultures were obtained which produced in rabbits the pathogenic effects of standard bovine tubercle bacilli. All except one of these strains were dysgenic and exhibited the same range of variation of cultural characteristics as tubercle bacilli of bovine origin. The exceptional strain grew rather more luxuriantly (on glycerine egg and glycerine agar) than any strain which I have so far found in bovine tuberculous lesions, though not with the luxuriance of standard human strains. The eugenic character of this strain was not altered by passage through the body of the rabbit. None of the viruses was tested in culture on the guinea-pig, since the original material of each had produced typical tuberculosis in this species of animal.

The results in rabbits of the inoculation of the 15 strains of culture are briefly summarised in Table I. The rabbits

TABLE I.—Experiments on Rabbits with Virulent Strains.

No. of case.	No. of rabbit.	Dura-tion of life.	Result.
114	1632	Died	G.M.T. of moderate not full severity.
	K. 58		G.M.T. severe in lungs only.
	D. 47		Typical G.T. of organs and glands.
	1613		" " "
118	1757	K. 50	Typical G.T. but only few lymph glands affected
	1758	(III)	Typical G.T. of organs and glands.
122	1788	D. 53	" " "
	1789	D. 67	" " "
133	1940	K. 59	" " "
	(dying)	D. 42	" " "
139	1978	D. 44	Typical G.T. but liver and spleen not affected
	1979	D. 69	Moderate G.T.
143	2011	D. 19	Typical G.T. of organs and glands.
	2012	D. 73	Chronic G.T.
	255	D. 97	" " "
146	2009	D. 45	Typical G.T. of organs and glands.
	2110	D. 63	" " "
148	2044	D. 56	" " "
	2169	D. 53	" " "
	2001	D. 51	" " "
150	2023	D. 72	Moderate G.T.
	2024	D. 40	Typical G.T. of organs and glands.
151	2045	D. 21	Moderate G.T.
	2046	D. 31	Typical G.T. of organs and glands.
153	2058	D. 67	" " "
	2059	D. 26	" " "
156	2154	D. 36	" " "
	2055	D. 28	" " "
157	2162	D. 37	" " "
	2067	D. 61	" " "
158	2066	D. 35	" " "
	2157	D. 47	" " "
159	2164	D. 54	" " "
	2065	D. 38	" " "

K. = Killed.

D. = Died.

G.(M.)T. = General (miliary) tuberculosis.

were inoculated subcutaneously between the shoulders, each with 10 mgm. of moist growth from young serum cultures. The initial weights of the rabbits ranged from 1200 to 2800 gm.

##### (2) Standard Human Strains.

From 19 viruses (18 cervical and 1 axillary gland) cultures were obtained which grew on serum and glycerinated media with the characteristic luxuriance of the human type of tubercle bacillus. The virulence of these 19 viruses was tested on the guinea-pig by the intraperitoneal inoculation

of original material, and on the rabbit by the subcutaneous inoculation of culture. As a result of these tests, 17 of the 19 viruses could be readily classified as of standard human type—that is, the original material produced typical tuberculosis in guinea-pigs and the culture proved of low virulence for the rabbit.

With the other two viruses (Nos. 128 and 129) the results of similar tests were inconclusive. The original material of these viruses produced very slight tuberculosis in guinea-pigs, and a culture of each gave rise in the rabbit to local tuberculosis only. Further experiments were therefore necessary to determine whether or not this limited pathogenic effect was due to attenuation of the viruses. Cultures of the viruses were accordingly tested on the guinea-pig, one of the two animal species which differentiate standard human from attenuated human viruses. The culture from virus 128 was tested twice on guinea-pigs. On one occasion 2 guinea-pigs were inoculated subcutaneously, each with 1 mgm., and both animals died of typical severe general tuberculosis in 96 and 108 days respectively. The second test was made on three guinea-pigs, one being inoculated intraperitoneally, the other two subcutaneously, each with 1 mgm. The former guinea-pig died in 18 days of tuberculosis, not very severe, and hemorrhagic pleural effusion. One of the subcutaneously inoculated guinea-pigs died in 50 days of general tuberculosis of mild type. The third guinea-pig was killed 228 days after inoculation, and showed tuberculosis limited to the site of inoculation and near the glands. The results in guinea-pigs with this virus are confusing and difficult to interpret. But in view of the fact that 4 of the 5 guinea-pigs inoculated with culture of this virus died of tuberculosis, the disease in 2 being typical and of maximum severity, the slight effect in the fifth guinea-pig should, I think, be regarded as due to some accidental circumstance. I have therefore classified the virus with standard human viruses. The culture of the other virus (No. 129) did not produce typically severe tuberculosis in any of the guinea-pigs inoculated and for this reason I have included it among the atypical viruses. Thus, of 19 eugonic viruses, 18 are classified as standard human viruses and 1 as atypical.

The results obtained in rabbits by the inoculation of the 18 standard viruses are summarised as follows:—

The (young serum) cultures of the viruses were injected subcutaneously into 27 rabbits, the doses ranging from 10 to 60 mgm. One rabbit died prematurely in 30 days and showed very slight disseminated tuberculosis. Of the remaining 26, 2 died 68 and 86 days after inoculation from causes other than tuberculosis and 24 were killed in periods varying from 98 to 150 days. In 2 of these 26 rabbits the disease was confined to the site of inoculation, and in 2 others there was extension to the nearest glands. In the other 22 rabbits there was besides a local lesion and (in 8) disease of adjacent glands some amount of disseminated tuberculosis. The lungs were affected in every one of these rabbits, the disease being slight in 20 and of moderate severity in 2. The kidneys of 4 rabbits contained a minute tubercle or two. A popliteal gland of one rabbit contained a caseous tubercle from which a eugonic culture was isolated, and the omentum of another contained several gritty tubercles.

From one of the 18 viruses (No. 124), in addition to the strain isolated from tuberculous cervical glands, a culture of tubercle bacilli was obtained from another tuberculous focus, an intermuscular abscess. This latter strain, while identical with the cervical gland strain in cultural characteristics, differed from it and other standard human strains in virulence. Details of the experiments with this strain are given in the next section.

### (3) Atypical Strains.

In my first series of cases of glandular tuberculosis all the cultures isolated could be readily classified either as standard human tubercle bacilli or as standard bovine tubercle bacilli. In the present series, on the other hand, three cases have yielded cultures which do not correspond exactly either to the human or to the bovine type of tubercle bacillus. Two of these three atypical cultures were obtained from cervical glands, while the third, referred to above, was derived from an intermuscular abscess in a patient also suffering from tuberculosis of the cervical glands.

A detailed account of the experimental results with each of the three strains follows.

CASE 129.—Female, aged 51 years, with recurrent tuberculous cervical glands. The woman had had glands removed from the neck several times during the last 20 years. The glands sent for investigation were from the submaxillary

region. Two glands the size of peas, containing caseous substance, and two normal to the naked eye were emulsified and inoculated into two guinea-pigs. No tubercle bacilli were found in the emulsion on microscopic examination. One of the guinea-pigs was killed 33 days after inoculation, and showed slight general tuberculosis. The other, killed 206 days after inoculation, showed enlargement and fibrosis of lymphatic glands, two grey tubercles in the spleen, chronic fibroid tuberculosis of a testis and epididymis, and no disease elsewhere. A culture isolated from the first guinea-pig produced on the differential media the luxuriant growths of the human type of tubercle bacillus. A rabbit inoculated subcutaneously with 15 mgm. of the culture and killed 144 days later showed a local lesion only. Three guinea-pigs were inoculated subcutaneously, each with 0.1 mgm. of the culture. One died prematurely in 68 days, and showed slight general tuberculosis. Another died in 130 days of chronic general tuberculosis of mild type, the lesions in the organs and the glands showing little or no necrosis or caseation. The third guinea-pig was killed 132 days after inoculation, and was found to have slight retrogressive tuberculosis, the abdominal and thoracic glands were slightly enlarged and fibrotic, the spleen contained a calcareous tubercle, and there were a few grey tubercles in the liver.

The results of the inoculation of guinea-pigs with original material and culture indicated that the virus was of lower virulence than standard human viruses.

CASE 124.—Female, aged 13 years, with cervical adenitis and an abscess in the muscles of the thigh. The patient was admitted to hospital in June, 1915, suffering from enlarged softened glands and sinuses in the neck. There was also an extensive abscess in front of the left hip-joint, which developed subsequent to the adenitis and before her admission to hospital. This abscess was intermuscular; it was not connected with the joint and there was no evidence of true hip disease. The thigh abscess and the neck abscesses were treated by aspiration. The girl was discharged in November, 1915, when there was no evidence of active tubercle. The thigh abscess had been successfully aspirated and no signs of it remained. The sinuses in the neck were all healed and there were no active glands.

*Investigation of material from the neck.*—Pus from a sinus and a cervical gland caused typical tuberculosis in guinea-pigs, and yielded cultures with the cultural characteristics of the human type of tubercle bacillus. One of the strains exhibited slight virulence for the rabbit.

*Investigation of material from the thigh abscess.*—No tubercle bacilli were found in a smear preparation of the pus of this abscess, but direct cultures were obtained, about a dozen colonies of tubercle bacilli appearing on each of three egg tubes. Two guinea-pigs inoculated intraperitoneally with the pus increased in weight, and when killed 262 days after inoculation showed very slight retrogressive tuberculosis. There was no omental or peritoneal tuberculosis; the inguinal and iliac glands were slightly enlarged and fibrotic, and in one guinea-pig there was retrogressive tuberculosis of an epididymis.

The culture isolated directly from the pus grew on serum and glycerine media with the characteristic luxuriance of the human type of tubercle bacillus. A rabbit inoculated subcutaneously with 20 mgm. of the culture developed a local lesion only. Three guinea-pigs were inoculated subcutaneously, each with 0.1 mgm. of the culture. One died in 168 days, and showed chronic general tuberculosis of fibroid type. The other two were killed 216 days after inoculation. In one tuberculosis was confined to the glands adjacent to the site of inoculation. In the other there were, in addition to local tuberculosis, scattered grey tubercles in the liver and one tubercle in the spleen.

The experiments on the guinea-pig with original material and culture demonstrated conclusively that the tubercle bacilli from the thigh abscess were of definitely lower virulence than standard human tubercle bacilli.

CASE 116.—Male, age 11 years, with tuberculosis of cervical glands. Material from this patient was received on two occasions. The first material was a dressing taken from a sinus in the neck on Feb. 19th, 1915. The second was pus aspirated on March 5th, 1915, from a cervical gland abscess. Three guinea-pigs were inoculated, two with sinus pus and one with aspirated pus. Typical, though not severe, general tuberculosis was produced in all three guinea-pigs. Two strains of culture were isolated, one through the guinea-pig from the sinus pus, the other directly from the aspirated pus. The cultural characteristics of the two strains were identical. On serum and glycerine serum they produced good growths, with yellow pigment. On glycerine agar, after a month or six weeks, there were thin dull-grey layers composed of microscopic colonies; on further incubation numerous whitish warty colonies appeared, some of which attained the size of millet seeds. On glycerine-potato thin, finely granular grey layers were produced, in which raised colonies of diverse form subsequently developed. No growth was obtained on glucose or glycerine broth. The cultural characteristics of both strains were unaltered.

by subculture on glycerine serum (12 and 14 subcultures). Three rabbits were inoculated subcutaneously, two with 10 mgm. of the direct strain and one with 30 mgm. of the guinea-pig strain. They were killed 99 to 110 days later and showed cystic caseous lesions and one or two small tubercles in the lungs; in each of two rabbits the scapular glands were also slightly tuberculous. A culture recovered from one of the rabbits was identical with the original culture and proved of low virulence for two rabbits inoculated subcutaneously.

*Summary of characteristics of virus.*—Cultures eugenic on (bovine) serum and glycerine serum, dysgenic on glycerine agar, potato, and broth. Virulence for guinea-pigs and rabbits that of the human type of tubercle bacillus.

Of the three strains, the properties of which are described above, two were identical in cultural characteristics with the human type of tubercle bacillus, but they differed from standard human strains in their relatively low virulence for the guinea-pig. These two strains, therefore, exhibit the attenuation of virulence which has hitherto appeared peculiar to the majority of lupus strains, and are the only such strains which have so far been obtained in this country from human tuberculous lesions other than those of lupus. The third strain had the virulence of standard human tubercle bacilli, but did not correspond exactly either to the human or to the bovine type of tubercle bacillus in cultural characteristics. Strains identical in every respect with this strain have recently been found in the sputum of phthisical persons and in cases of human bone and joint tuberculosis<sup>1, 2, 3</sup>.

## II. Statistical Data.

In my first series of cases cultures of tubercle bacilli were obtained from 71 persons suffering from glandular tuberculosis. Of these 71 cases, 68 were believed to be primary in the cervical glands; 1 was a case of cervical gland tuberculosis, probably secondary to pulmonary tuberculosis;

TABLE II.—Clinical Particulars of Each Case and Bacteriological Results.

No. of cases.	Date of receipt of material	Patient's place of residence.	Patient's sex and age in years.	Description of original material.*	Classification of cultures isolated.
112	9/1/15	Newcastle.	F., 7	Pus and caseous débris.	Human.
114	9/1/15	Cambridge.	M., 5	Glands containing caseo-calcareous nodules.	Bovine.
116	19/1/15	Exeter.	M., 11	(a) Dressing from neck sinus. (b) Pus from neck abscess.	Atypical.
117	19/1/15	Cambridge.	F., 21	Large caseous and softened glands.	Human.
118	26/4/15	Liverpool.	M., 7	Fibro-caseous glands.	Bovine.
119	3/5/15	Orkney.	M., 10 <sup>1/2</sup>	Pus (no T.B.).	Human.
120	6/5/15	Liverpool.	M., 7	Caseous glands.	"
121	10/5/15	"	F., 50	Pus (aspirated).	"
122	17/5/15	Brynmawr.	M., 7 <sup>1/2</sup>	(a) Pus from neck. (b) Pus from thigh.	Bovine.
123	14/5/15	Prendre, Meath.	M., 2 <sup>1/2</sup>	Caseous glands.	Human.
124	29/5/15	Nantbyr.	F., 13	Fibroid hyperplastic glands.	Atypical.
125	28/7/15	Liverpool.	F., 17	Caseous glands.	Human.
126	31/7/15	"	F., 19	Calc. caseous gland.	Human.
128	19/8/15	"	M. <sup>(adult)</sup>	Fibroid hyperplastic glands.	"
129	28/8/15	"	F., 51	Caseous glands.	Atypical.
130	6/9/15	"	M., 14	"	Human.
131	13/9/15	"	F., 19	"	Human.
133	6/10/15	Leicester.	F., 8	"	Bovine.
134	9/10/15	"	F., 18	"	Human.
136	6/11/15	"	M., 16	"	"
137	4/12/15	"	F., 15	Hyperplastic glands.	"
139	9/12/15	"	sex, 9	Caseous glands.	Bovine.
143	11/12/16	Alton.	F., 13	Pus.	Human.
146	23/1/16	Manchester.	M., 1 <sup>1/2</sup>	Caseous glands.	"
148	6/3/16	Midhurst.	F., 15	Pus.	"
149	7/3/16	Manchester.	M., 8	Caseous (axillary) glands.	Human.
150	13/3/16	"	F., 11	Caseous glands.	Bovine.
151	25/3/16	"	F., 5	Caseo-calcareous glands.	"
153	29/4/16	Alton.	F., 17	Pus.	Human.
154	19/4/16	Manchester.	F., 13	Caseous glands.	"
155	22/4/16	"	M., 9	"	Bovine.
156	24/4/16	"	M., 8	"	"
157	1/5/16	"	M., 4 <sup>1/2</sup>	Caseous-softened glands.	"
158	13/5/16	"	F., 4	Caseo-purulent glands.	"
159	17/5/16	"	F., 6 <sup>1/2</sup>	"	"

\* Except where otherwise stated the material was taken from glands of the neck.

and 2 were cases of axillary gland tuberculosis. In the present series 35 cases have yielded cultures: of these, 34 were cases of primary cervical gland tuberculosis, and 1 was a case of axillary gland tuberculosis. There are in all, therefore, 102 cases of primary cervical gland tuberculosis upon which to base statistics as to the relative frequency of different types of tubercle bacilli in this form of human tuberculosis.

Table III. gives the proportion of the different types of tubercle bacilli found at various age-periods in this series of 102 cases.

TABLE III.

Age-periods.	Number of cases.	Number infected with—			Per-cent-age bovine.
		Human T.B.	Bovine T.B.	Atypical T.B.	
Under 5 years ... ...	14	2	12	—	85·7
5-10 years ... ...	29	10	19	—	65·5
10-15 years ... ...	20	12*	7	1	35·0
15-20 years ... ...	18	12	6	—	33·3
20 years and upwards ...	21	16	4	1	19·0
Totals ... ... ...	102	52	48	2	47·0

\* An attenuated "human" culture was obtained from a thigh abscess of one of these cases.

The figures show that in childhood cervical gland tuberculosis is caused more frequently by the bovine than by the human type of tubercle bacillus, nearly three-quarters (72·1 per cent.) of the cases in children under 10 years of age having yielded bovine tubercle bacilli. In persons over 10 years of age infection of human origin is more common, bovine infection accounting for about a third of the cases in the 10-20 years age-period and for rather less than a fifth of the cases in persons over 20 years of age.

The material used in my investigation of cervical gland tuberculosis has been derived mainly from cities and towns in England and Scotland, and, while the cases from the different localities are too few for comparative statistical purposes, it is noteworthy that a proportion of the cases from each centre of population has yielded tubercle bacilli of bovine type. If the figures for the whole of England are compared with the combined figures for Scotland, it is found that the proportion of bovine infections in children under 10 years of age is about the same for the two countries (in my first series the English percentage figure was lower than the Scotch). In persons over 10 years, on the other hand, the proportion of cases in which the infection was "bovine" is much higher in the Scotch than in the English series. The Scotch data are, however, too scanty to form a basis for inference. The figures for the two countries are set out in Table IV.

TABLE IV.

—	No. of cases.	Human	Bovine	Per-cent-age bovine.	5-10 years	Human	Bovine	Per-cent-age bovine.
					Under 10 years.			
Scotland ...	11	3	8	72·7	6	2	4	66·6
England ...	30	8	22	73·3	51	39*	12	23·5

\* Including 2 cases which yielded atypical cultures.

Of the 4 cases of cervical gland tuberculosis not accounted for in Table IV. 2 came from Wales, 1 from Ireland, and 1 from Orkney. Bovine tubercle bacilli were obtained from 1 (Welsh) case, human tubercle bacilli from the other three. Three cases of axillary gland tuberculosis yielded one "bovine" strain and two "human" strains.

References.—1. Investigations of Strains of Tubercle Bacilli Derived from Sputum. THE LANCET, April 1st, 1916, p. 721. 2 and 3. Investigations of Human Bone and Joint Tuberculosis, Journal of Pathology and Bacteriology, vol. xxii., p. 54, and Journal of Hygiene, vol. xv., No. 2, Jan. 14th, 1916, p. 259. For references to previous work on cervical gland tuberculosis, see THE LANCET, June 19th, 1915, p. 1275.

THE King has appointed the following to the Order of the Hospital of St. John of Jerusalem in England:—Knights of Grace: Colonel Eustace Augustus Burnside, A.M.S., and Surgeon-General Francis John Jencken.

## NOTES ON 73 CASES OF CEREBRO-SPINAL FEVER.

BY SHEFFIELD NEAVE, M.R.C.S., M.R.C.P. LOND.,  
TEMPORARY CAPTAIN, R.A.M.C.

THESE cases included all those occurring in East Suffolk, both civil and military, during the epidemic period of 1915-16, from Nov. 19th to August 14th. Except two, they all occurred within a radius of 20 miles in towns, barracks, and camps, as opposed to the country, and these were in small cottages where air-space per head was singularly deficient. None occurred in private houses of any size. They were treated at four centres conveniently situated for the areas connected with them. The average mortality was 44.2; average age 17.2 years: 8 cases under 5 years, 10.95 per cent., 57 cases between 5 and 25, 78.1 per cent., 8 cases over 25, 10.95 per cent. Maximum age, 56 years; minimum, 9 months.

*Etiology.*—There was a very close parallel in the rise and fall of the number of cases during the season of the epidemic in this district to that published by the Local Government Board of the cases in the British Isles, excluding military cases. As each month progressed the two curves followed each other closely. Our knowledge of the seasonal nature of so many diseases, including cerebro-spinal fever, is in a very unsatisfactory state, and the inclination of so many to be satisfied with the statement that in summer it is the higher temperature and in winter the lower temperature that accounts for it, does not tend towards further investigation of what is now an important mystery. Plants have their season, being, no doubt, adapted by selection, but it is difficult to see the connexion between the season and micro-organisms in the same way.

In this case the weather was undoubtedly different in different parts of the country and the *post hoc* cannot be considered proved as a *propter hoc*. The fact that colds are more prevalent in winter and that meningococcus specially affects the naso-pharynx does not give an adequate explanation of this correspondence of cases. Very few cases begin with catarrh.

An exception to the above parallel was that the epidemic here closed with a number of mild cases, finishing in the middle of August with an outbreak of 19 cases in 26 days, as described in THE LANCET of Dec. 30th last by Fleet-Surgeon T. D. Halahan. This, it might be argued, was caused by the hotter weather increasing the activity of the organism as is stated in respect of typhoid and diphtheria with their autumnal season, but surely this would militate against the winter theory.

Except in two instances, only one case came from the same house, notwithstanding that there was overcrowding in several instances, but this did not hold good in the case of large dormitories. From one small tenement three small children of 6, 4, and 3 years of age died of a fulminating form of the disease, only living a few hours after onset. From another similar dwelling a boy died within seven days, while his sister had a slight attack.

Weather, fatigue, and exposure do not seem to be important factors in the etiology of this disease.

A large Government training establishment in this district gave great opportunity for studying the etiology of the disease if time had permitted. Cases seem to crop up throughout the year at intervals of about two months or less with an exacerbation at the end of the epidemic season. The general character of the disease was very mild here and the death-rate very low compared to the other centres of infection, and considerably lowered the mortality of the whole. In July and August, when the epidemic had abated in the country generally, a number of cases occurred of a character so mild and transient that 7 out of the last 10 were only clinically diagnosable for a few days and no bacteriological confirmation was possible and yet out of the remaining 3 there were 2 deaths. During this outbreak a bacteriologist was specially sent to take charge.

The sanitary conditions are excellent, both with regard to ventilation and all other matters. It would appear that the organism increases in virulence when it has the opportunity of passing from naso-pharynx to naso-pharynx among a collection of young people, which is, according to present lights, the most favourable soil for its growth, and that this

is even more a factor than the accessory point of ventilation of buildings, the importance of which is demonstrated by the fact that the disease is seldom acquired in the trenches. It would seem, therefore, that if a number of young naso-pharynges are collected in any building, however well ventilated, the organism will succeed in transferring itself and increasing in virulence. This also seems to be much enhanced where the said young population is a floating one, a large proportion going and others taking their place, and so giving a greater variety and quantity of soil in which to grow.

In the matter of incubation period this outbreak was also instructive. Many of the cases had just returned from leave or were newcomers, and in analysing the facts as to where they had been on leave it was shown that the localities were distributed in many parts, and there was nothing to show infection while away. Thus there were 2 cases which fell ill one day after return, 3 two days, and 3 seven days. This would tend to show that incubation may in some cases be only one day before clinical symptoms appear.

*Symptoms.*—The most prominent details of the disease vary much in different cases. At each centre of the disease in the above list it was observed that there was often a similarity in the most pronounced symptoms, and when a number of cases were admitted near together in time the prominent details of the disease were much alike, as if the particular strain of organism had a special effect.

In the same way it may be observed that the intensity of the disease was very different at different centres, as shown by the highest and lowest death-rates being 77.7 and 14.8 per cent. Owing to the impossibility of doing routine agglutinations, it was not possible to ascertain how far the above facts could be explained by the various strains shown to exist.

Incontinence of urine and faeces was common, usually following on retention of urine. Meningococcus was twice found as a cause of the accompanying cystitis, but when the prevailing organism was sought for late in the bladder trouble it was not found, but in its place usually coli or a staphylococcus, and these were very obstinate and difficult to eradicate. In 3 cases there was severe pain in both sides of the chest and in 2 in the abdomen, as if corresponding to the dorsal nerves from definite vertebrae, as in herpes and Pott's disease. In another case there was severe pain in the arms and in another at the anus, but none lasted more than three days.

A number had a difficulty in swallowing, which necessitated nasal feeding, while others had an obstruction to respiration with stridor, which obtained during sleep and woke the patient up, when the obstruction desisted, but was immediately repeated on again falling asleep. This occurred in bad cases.

There was one case of pneumococcal pneumonia accompanying the disease, as mentioned by Osler as being common in a New York epidemic.

Dilatation of the pupil was not frequent, and it usually reacted to light. Only 2 cases of photophobia occurred, where there was no conjunctivitis as well. The specific coccus was found in one case of conjunctivitis. The patient was seldom peevish, but could usually be roused from coma to make a reply. He seldom, when recovered, recollects the awful discomfort he appeared to be suffering.

One case—a child of 10—was seized late in a very typical attack with total flaccid paralysis of both legs, resembling that of anterior poliomyelitis, which has remained for many weeks. Incontinence of urine and faeces has also remained. She is still very slowly improving. Poliomyelitis may have here followed on the meningococcal attack.

Two cases of haematuria occurred. Only one case of rash attributable to serum occurred and only a small percentage of cases had a rash at all. No case with haemorrhagic patches recovered.

Fulminating and severe sthenic cases ending in early death numbered 18, exclusive of 2 which aborted. Chronic cases were 6 in number and mild cases 27. The remaining 22 were of an intermediate type not coming under these heads.

*Diagnosis.*—The facies of a fulminating or severe case at onset was almost diagnostic, as well as a peculiar smell. In testing for Kernig's sign pain was frequently elicited at the hip-joint and not at the knee-joint.

At quite the commencement of the disease a useful sign was found to be the inability to put the chin on the chest, and this sign was also often found to be the last to be lost of the head and neck signs, though stiffness of the lower portion of the spine and Kernig's sign usually had a longer duration.

**Agglutination.**—No agglutinating sera were available till the middle of the epidemic, and little could be done in this way. At first it was attempted to keep the coccus alive until time could be made to organise the process, but many failures resulted after long subcultivation. Later emulsions were made and these were kept until July, when the tests were done.

Twenty-two cultivations from cases were tested and gave the following results:—

No. 1 serum agglutinations ...	3 emulsions tested gave a positive result.
" 2 "	" ... 4 "
" 3 "	" ... 14 "
" 4 "	" ... 1 "

and two emulsions were not agglutinated by any of the four sera. In four of the above cases No. 1 serum agglutinated the same emulsion as No. 3 serum, but to a much lower dilution.

**Treatment.**—This presents the gravest difficulties. The variability of the disease in intensity prevents one distinguishing between *propter hoc* and *post hoc*. Thus, as an epidemic proceeds, the disease is reduced in virulence, and a practitioner having changed his remedies used at first when there was a high death-rate, attributes the lower death-rate to this change. Again, an epidemic in one place may take a very mild form, although only a few miles from another where the death-rate is high, as instanced above, and the practitioner is apt to think that it is due to his remedies—e.g., a different serum from that of his neighbour.

The cases under review were treated: 1. By lumbar puncture until the amount of fluid coming away was reduced to 20 c.c. or lower. It was usually done several days running at the commencement of the disease, and later every other day, till the above result was obtained or the patient much improved. There is no doubt as to the benefit obtained by this treatment.

2. By the intrathecal injection of 0·5 per cent. carbolic acid in normal saline, which was allowed to run out again, thereby constituting a form of lavage. No improvement could be definitely traced to this treatment; but where there was pain a great deal was got rid of in this way, and it was thought therefore to be beneficial in those cases.

3. By the intrathecal injection of serum. In a few cases at first Burroughs and Wellcome's and Mulford's brands were used, and at Shotley the serum from the Pasteur Institute, but by far the larger number were treated with the serum from the Lister Institute. Both the latter were made from Gordon's strains. This serum injection seemed to have no effect whatever.<sup>1</sup>

4. Soamin and vaccines were used in a few cases; neither appeared to do any harm or good.

5. Intramine was used in 2 cases with unsatisfactory results.

6. Tartrate of antimony was exhibited in 9 cases. In 6 cases it was injected intravenously. In one of these the patient had had a period of three weeks' daily remitting temperature characteristic of septicaemia after the main symptoms of the nervous system had subsided. Within 48 hours of a single injection the temperature became normal and remained so with an uninterrupted recovery.<sup>2</sup> The second case was similar but the remitting temperature had not continued so long. It was also given in 2 fulminating cases which aborted a few hours afterwards in a remarkable way. In 2 other cases it appeared to have no effect on the course of the disease, both patients dying, although in one of them the temperature was always lowered after injection.

It is hoped that this remedy thus applied will prove useful at any rate in septicaemic conditions both in this disease and generally. In 4 cases, including one of the unsuccessful intravenous cases, a very small dose was given intrathecally, but there was no evidence of its having any effect. The spinal fluid was tested two days after the

injection for antimony without any being found, showing it had already been excreted. This was done by Miss Gladys Cobbold, of Girton College, who kindly consented to give her time for the purpose.

#### Procedure.

Patients were removed to one of the hospitals either before or after first lumbar puncture, and it is desired here to thank those in charge of them for their permission and assistance in studying these cases. The puncture fluid was carried in a case in the bonnet of the motor, which kept it at from 30° to 35° C. until the laboratory was reached. One or two nasgar tubes were inoculated at the same time when the fluid was collected and carried in the same way.

**Lumbar puncture.**—The points observed in respect of this operation, which was done not less than 153 times, are as follows. 1. It is more important to work by the sense of touch than by the eye. The following was the method adopted: Two fingers of the left hand are laid on the ilium and two above it on the side of the patient; this puts the thumb in a good position to be placed between the spinous processes of the correct two vertebrae, and so gives a sense of position and direction not otherwise obtainable. The thumb then draws the skin upwards to render it more tightly stretched than is normal, the object being to prevent the skin slipping away from the point chosen for puncture by the rather blunt needle which is best to use, and so causing it to enter elsewhere than intended. If this operation is thus performed it does not matter on which side the patient lies. 2. It is quite safe to puncture in all three of the second, third, and fourth lumbar spaces. 3. In some cases no fluid may exist in the theca that can be drawn off, owing probably to inspissation, more especially after frequent puncture in severe cases. Here it is useful to inject normal saline and let that return through the same needle or through another in a space below. A turbid fluid is thereby obtained consisting of washings of inspissated pus, which are useful for cultivation and microscopic investigation, besides getting rid of objectionable material. This process is also useful in the cadaver.

The very slow injection of fluids by gravity—e.g., 1 c.c. per minute (Horder)—appeared quite unnecessary. It seems to be safe to inject slowly with a syringe while watching respiration and desiring if a change in rapidity makes its appearance. This change is usually a diminution. When a given amount has been injected in this way, and no effect has been noticed on the respiration, and has been allowed to run out again, it is safe to inject a similar amount a second time rather faster. On one occasion only 15 c.c. of cerebro-spinal fluid came away, and the injection of only 10 c.c. of saline caused a slowing of respiration. This again occurred exactly at the same point every time saline was injected again, after being allowed to run out, showing pressure probably on the respiratory centre in a case where the foramen of Magendie was obstructed.

No bad results were obtained from lumbar puncture or injection either immediately or later, but in the case of what turned out to be brain tumour and another with pneumonia there were difficulties in consequence of the general anaesthetic.

**Cerebro-spinal fluid.**—The most common contamination was due to *staphylococcus albus*, although the skin was carefully prepared with spirit or ether and iodine before puncture. This organism gave a good deal of trouble.

The fluid was searched for meningococcus by examining a film of the deposit stained by Gram's method, and where no growth on nasgar was obtained this was considered sufficient where clinical symptoms were undoubted.

The meningococcus was obtained by cultivation in 36 out of 55 cases, where it was seen in the purulent sediment of the fluid. In one case no organism was seen in the fluid, but a cultivation was successful.

In one case no organism was found in the first place, but a cultivation was obtained from the fluid during a relapse a month later.

In 10 cases the organism was not found, and here the probabilities of a positive diagnosis lay in the clinical tests for meningitis generally, the cytology of the fluid and the clinical symptoms.

In addition to the above there were 8 similar cases where the fluid was not examined in this laboratory, the bacteriologist at Shotley on his arrival taking them in hand.

<sup>1</sup> Probably due to the serum not having been made with Nos. 3 and 4 types.

<sup>2</sup> First dose 1·5 c.c. of a 2 per cent. solution, to be increased gradually to 6 c.c. if necessary in later doses.

In one case, while the fluid was clear and no organism was found in it, it was found in a throat-swab.

An excess of lymphocytes was several times found in a clear fluid that later became purulent.

It was remarkable how few cocci were found as a rule in a smear, and their number had no relation to the state of the pus cells whether degenerated or in good preservation. The pus often seemed to contain nothing but mononuclear or degenerated cells, but after a long search a large area of polymorph-nuclear cells was nearly always eventually found, showing that the mixture of cells was not on regular lines.

In one case the meningococcus was found alive in the fluid after it had been in the incubator for 23 days, but as a rule the organism was very difficult to keep alive on any media more than half that time. It was found that the fluid drawn from the cisterna magna after death for diagnosis gave better information than that from the lumbar region both in the case of cerebro-spinal fever and tubercular meningitis.

The amount of cerebro-spinal fluid in a normal adult is variously stated at 60 c.c. and 200 c.c., but on one occasion a surplus of 75 c.c. was taken from a baby of 9 months with normal measurement of the head, and this without undue depression of the fontanelle. No harm ever resulted from allowing the flow to continue until normal pressure was reached.

In 16 positive and 2 doubtful cases the fluid remained clear; all these were mild cases which recovered.

*Contacts.*—In taking swabs it was found best to abstain from using a tongue depressor, and that if the patient was induced to continue saying "ah," it was easy to introduce West's swab without discomfort to him.

Before inoculating the plates it was found necessary to wipe the glass tube carefully, so as to remove any secretion and to prevent any organisms from the mouth being sown and any inhibition of growth by saliva. Another method was to withdraw the wire upwards for inoculation. The plates received four or five drops of fresh serum and the swab was placed in these when being applied to the surface.

It was remarked that where the contacts had been living together the same flora appeared to a great extent, also that there are usually not more than two kinds of organism on the plate showing the selective nature of the part.

It was only possible for want of time to carry out the 23° incubator and sugar tests. The latter gave trouble. The most satisfactory tests were obtained by the addition of serum to the media. Positive cases varied very much in the length of time necessary for producing acid—viz., one to six days. Growth at 23° was delayed in some cases till the fifth day.

Owing to the absence of a systematic agglutinating test the percentage of positives was doubtless too high.

No contacts were known to catch the disease. Duration of the organism in a contact was usually less than 17 days, but one lasted for 11 weeks. The duration appeared to be independent of treatment. Out of 14 swabs taken at the commencement of an attack 3 were found positive only.

The following table shows the number of positive contacts as they occurred in each 100 swabbed, and the dates of same:

	+	-
First 100 November-March	10	90
Second 100 March-April	8	92
Third 100 April-May	8	92
Fourth 100 May	15	85
Last 103 June-August	6	98
	46	457

**MEDICO PSYCHOLOGICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND.**—The next general meeting of the association will be held on Thursday, Feb. 15th, at 3 P.M., at 11, Chandos-street, Cavendish-square, London, W., when a paper will be read, entitled "Dreams and their Interpretation, with reference to Freudism," by Dr. Robert Armstrong-Jones.

**LITERARY INTELLIGENCE.**—For the use of medical men engaged in war work, Messrs. J. and A. Churchill have published the following during the week: A sixteenth edition of "Minor Surgery and Bandaging," by Mr. H. Morriston Davies, and a second edition of "Sanitation in War," by Major P. S. Lelean, R.A.M.C. New illustrations have been inserted in this volume and the whole of the text has been revised.

## ON THE TREATMENT OF SCABIES AND SOME OTHER COMMON SKIN AFFECTIONS IN SOLDIERS. |

BY H. G. ADAMSON, M.D. LOND., F.R.C.P. LOND., PHYSICIAN FOR DISEASES OF THE SKIN, ST. BARTHOLOMEW'S HOSPITAL; HONORARY CONSULTANT FOR SKIN DISEASES IN MILITARY HOSPITALS IN LONDON.

MEDICAL men in charge of patients in military hospitals, convalescent homes, and camps are often called upon to diagnose and treat certain diseases of the skin. Contrary to what one might expect as a result of the conditions under which a soldier lives on active service, the list of these complaints is not a long one. Eczema, in the production of which local irritants are known to be a prominent factor, is by no means common among soldiers, in spite of infrequent baths and change of clothing. On the contrary, many men who in civil life have been victims of eczema, have lost that complaint while serving in the Army, perhaps as the result of a better state of general health. Neither does one see, as again one might expect to see among those who have been at the front, lichen planus, an affection which in civil life is often caused by stress or nervous worry. The really frequent skin affections of soldiers are comprised among the more common contagious skin diseases. Pediculosis, scabies, impetigo contagiosa are probably the most prevalent, then certain forms of ringworm. If we add to these the eruptions of secondary syphilis and psoriasis vulgaris, these half-dozen affections are those with which a military doctor is most likely to meet.

Pediculosis is mainly a complaint of the trenches, and, as "the louse problem of the western front," its management has been fully discussed in the medical journals. Syphilis is a disease which at once passes out of the hands of the local medical officer to be treated in special hospitals for venereal diseases.

Scabies, impetigo contagiosa, and to a less extent ringworm, though in a sense trivial complaints, are nevertheless responsible for the temporary invaliding of hundreds, perhaps thousands, of otherwise able-bodied men. Measures for the treatment of these diseases are therefore worthy of attention. Psoriasis also invalids many otherwise healthy men and sends them to hospital either because of the extent and consequent discomfort of the eruptions, or because the eruption is looked upon with suspicion by the man's companions.

### Scabies.

It is a very good rule, when a soldier (as, indeed, a civilian), of whatever rank, complains of itching, to think first of scabies, and to exclude that disease before giving consideration to any other. Itching at night is particularly suggestive of scabies.

One looks between the fingers and about the wrists for "burrows," and on the buttocks, and particularly on the penis, for red raised ridges, the result of burrows which have become inflamed by scratching or infection.

On the fingers and wrists the burrow is seen as a narrow wavy line, generally black from included dirt, and  $\frac{1}{8}$  inch to  $\frac{1}{4}$  inch long. Sometimes there is near, but not actually at one end of, the burrow a clear pinhead-sized vesicle—the pearly vesicle—over the roof of which the burrow passes. When examined with a lens the acarus can be seen at one extremity of the burrow as a whitish speck like a minute smooth flat pebble imbedded in the skin. When seen it can be easily removed by touching it with the point of a darning needle and examined under the microscope in a little liquor potassæ, and the diagnosis is certain once for all. This is the only sure way of finding the acarus; to grope for it blindly in the burrow or the pearly vesicle is useless.

As has been stated, burrows sometimes become inflamed, and an "inflamed burrow" forms a red, raised, ridge-like papule, on the crest of which the burrow can be seen on close inspection. The elongated shape of the papule is alone suggestive of scabies, and an "inflamed burrow" on the penis is a sure diagnostic sign of scabies in a man.

But scabies is often complicated by (a) impetigo contagiosa or by (b) eczema, and in either case it may be then less easy to find a typical burrow and an acarus.

When complicated by impetigo, the hands and feet particularly are the seat of vesicles and blisters with clear or turbid contents, together with crusts, erosions, and inflamed burrows; and there may be crusted infiltrated nodules (ecthyma) on the buttocks, and often crusts and erosions on other parts, sometimes here and there a small furuncle.

When eczema complicates scabies there are red, rough, eczematoid areas, sometimes dry and sometimes weeping, on the hands, arms, thighs, and trunk, masking often the burrows of the original complaint. In many instances the eczema is caused by too prolonged use of sulphur applications, but it may also result from constant scratching in scabies of long standing.

In respect to the contagion of scabies, it should be remembered that it is usually in men a venereal disease, but that it may also be conveyed to others by means of things which are handled, such as books, playing-cards, dominoes, and utensils of all sorts.

*Treatment of scabies.*—It was said by Hebra 50 years ago that "there is, perhaps, scarcely any other curable disease for which so many and various remedies have been proposed as for scabies. Those enumerated in medical works amount to hundreds." Of the treatments which have survived there is none, perhaps, so universally employed to-day as that recommended by Hebra of baths, soap, and sulphur ointment. The method of "sulphur fumigations," recently recommended by Major John Bruce and Captain Stanley Hodgson, dates back from the seventeenth century, and it is worthy of remark that Hebra said of this method after a trial in the General Hospital of Vienna, that "the results obtained were not such as to lead to the further adoption of the method, for it was found to set up artificial eczematous eruptions, which so greatly prolonged the treatment that its average duration exceeded four weeks."

The all-important points in dealing with cases of scabies are (1) to make sure of the diagnosis, if possible by finding an acarus; (2) to then carry out a very thorough treatment for a strictly limited period. Doubt in diagnosis often leads to ineffectual treatment; treatment ineffectual but too long-continued leads to eczema or sulphur dermatitis and still further confuses the diagnosis.

The simplest and most efficacious treatment is as follows:—

- (1) R Saponis mollis ... ... 24 oz. (700 gm.)
- (2) R Ung. sulphuris ... ... 24 oz. (700 gm.)

S. The soap and ointment for three applications.

(1) A hot bath of half-an-hour's duration is taken on three consecutive days. During the bath the body and limbs, especially the hands and wrists and buttocks, are scrubbed with soft soap by a flesh brush.

(2) After each bath the patient himself rubs in the ointment and puts on an old sleeping suit, gloves, and socks and goes to bed, where he remains until it is time for the bath on the next day.

The baths and inunctions must on no account be continued beyond the three days. The patient gets up and dresses after the three days and usually requires no further treatment, but is kept under observation for another three days. If, as sometimes happens, some itching continues he is given the following lotion to mop on night and morning.

- R Liq. picis carbonis... ... 1 dr. (4 c.c.)
- Aq. ... ... ... ... 20 oz. (600 c.c.)

If the treatment has been thoroughly carried out the patient is cured and free from infection after the three baths and inunctions. If a case is not cured in this way, it is probably not scabies, but either a papular urticaria or chronic eczema. For the former affection a lotion of ordinary vinegar is often efficacious. For the eczema a zinc ointment as follows should be freely applied and all baths forbidden.

- R Zinci oxid... ... ... 1 oz. (30 gm.)
- Pulv. amyli ... ... 1 oz. (30 gm.)
- Vaseline. ... ... ad 10 oz. (300 gm.)

By this method of treating scabies, with one bath and a good supply of hot water, from 12 to 16 men can have treatment each day, or a complete cure for 24 to 32 men per week, and so on, in proportion to the number of baths available. Clothes may be disinfected, but in practice this is found to be unnecessary. Brushing and airing of outside clothes and washing of underclothes suffice.

#### *Impetigo Contagiosa.*

It has been already remarked that impetigo may complicate scabies and that it then attacks particularly the hands, buttocks, and thighs. But it often occurs apart from scabies as single cases or in small epidemics.

Its usual situation is then the face, beard region and scalp, and the fingers. It is of common occurrence as a result of a visit to the barber or from using a public towel. It usually begins on the beard region as scattered isolated crusts, which quickly spread on to other parts of the face, about the ears, and sometimes on to the neck and scalp. It is often mistaken for sycosis or for eczema, but it is easily

recognised by the appearance of "stuck on" amber-coloured crusts from the size of a split pea to that of a shilling. Each of these crusts represents the dried serum of a blister, but the drying takes place so quickly that the original blister is seldom seen, though on removing a crust with forceps there is revealed a raw weeping surface, which is the base of the blister. Frequently there is a phlyctenular whitlow on a finger or thumb around the root of the nail, and there may be crusted patches on the hands or forearms.

This eruption is often wrongly supposed to be of staphylococcal origin, but it is really due to a streptococcal infection. If untreated the infection spreads rapidly, especially in hot climates or warm weather. If effectively treated the eruption may be cured in a few days or a week, but if not rightly dealt with, sooner or later a secondary staphylococcal infection supervenes. The staphylococcus invades the hair follicles of the beard, eyebrows, eyelashes, and scalp, and a deep-seated, intractable, sometimes incurable, pustular dermatitis results. On the beard region this staphylococcal infection is known as *sycosis*, and on the eyelids as blepharitis, but the exactly similar condition on the scalp and eyebrows has no definite name, and is often wrongly called pustular eczema. It might be called *sycosis capitis*, or chronic impetigo.

*Treatment of impetigo contagiosa.*—The essential part of the treatment of impetigo is the complete removal of every scrap of crust in order that any antiseptic application may reach the site of the invading micro-organism.

The patient should be made to mop off the crusts with a wad of wool and hot water, and to continue to mop for half an hour or until every crust is removed. A lotion of 1 in 6000 hydrarg. perchlor. is then daubed on for a few minutes and a diluted white precipitate ointment applied (hydrarg. ammon. chlor. 10 gr. (0.6 gm.), vaseline 1 oz. (30 gm.)). The bathing and application of ointment is repeated several times daily and continued until no fresh crusts are formed. In this way the most extensive eruptions can be cured in a few days. Without the thorough removal of crusts the ointment fails to reach all the infected parts and the eruption continues. With wrong or inefficient treatment a secondary staphylococcal infection supervenes and an intractable chronic impetigo or "sycosis" results. If dealt with early a "sycosis" may often be quickly cured by staphylococcal vaccines, but where long established vaccines fail, and other treatments, including X rays, may be tried in vain until the man is finally discharged from the Army as incurable.

#### *Ringworm.*

Ringworm is a third contagious skin complaint which may incapacitate soldiers, though it is less generally prevalent than either scabies or impetigo.

It may occur on the beard region or on the forearms in the form of large disc-like inflammatory plaques with pustulating points as the result of infection from horses, and epidemics of "horse-ringworm" of this sort were at one time prevalent in certain cavalry camps, but have apparently now ceased to occur.

More general forms are ringworm of the groin (*tinea cruris* or Diphilic itch) and eczematoid ringworm of the extremities. Groin ringworm is perhaps more often met with among officers, and ringworm of the toes and feet particularly in hot climates or during warm weather. Ringworm of the groin and the interdigital ringworm may sometimes be associated in the same patient. Ringworm of the toes and feet most calls for attention because it is less generally known and recognised as such. In its mildest form it causes red, dry, or excoriated surfaces between the toes due to peeling off of the horny layers of the epidermis. The red surfaces are sharply margined from the normal skin by an overhanging fringe of epidermis and they generally extend on to the sole of the foot. In cold weather it often remains in this condition and causes comparatively little discomfort. In hot weather, and in tropical climates especially, the eruption may spread rapidly and extend over the foot and even up the leg to the knee in the form of blisters and excoriations, sometimes with oedema of the leg. Many such cases were seen invalided from Gallipoli.

One of two measures may be adopted in treating any of these forms of ringworm.

(1) The application of an ointment which we owe to Dr. Arthur Whitfield—viz.:

- R Acid. benzidi ... ... ... 15 gr. (1 gm.)
- Acid. salicylic ... ... ... 15 gr. (1 gm.)
- Oi. coca-nucls... ... ... 3 dr. (12 gm.)
- Vaseline. ... ... ... ad 1 oz. (30 gm.)

In cases where there is vesication the inunction should be preceded by fomentation with hot water. Many cases quickly clear up with this treatment, but sometimes part of the eruption in the groin, or between the toes,

or on the soles remains obstinate, and for these cases a useful treatment is:—

(2) First thoroughly mop the affected parts with *tinctura iodii*; then rub on *argent. nitratii* 10 gr. (0·6 gm.), *spiritus etheris nitrosi* 1 oz. (30 gm.). Repeat this treatment if necessary, and apply the benzoic acid ointment between whishes.

For the treatment of *psoriasis* in soldiers it is but waste of time to try internal remedies. They are generally disappointing, and, in any case, show no results for weeks. It is better to at once apply local remedies.

The following ointment is often successful in removing the eruption:—

B. Hydrg. ammon. chlor. ....	1 dr. (4 gm.)
Liq. picis carbonis....	... ... ... $\frac{1}{2}$ oz. (15 c.c.)
Ung. paraffin. B.P. ....	... ... ... 6 oz. (180 gm.)

S. The ointment to be well rubbed in twice daily with a piece of flannel. This ointment, which is made with a stiff basis—ung. paraffin—is usually more effectual than when made with simple vaseline. If this ointment fails, ung. chrysarobini B.P. should be employed, with the usual precautions of avoiding the face, hands, and scalp, and relaxing the treatment if chrysarobin erythema appears at any part. The patient should be kept in bed when chrysarobin ointment is used.

The treatment of psoriasis will be usually slow, but for most of these complaints it may be said that with prompt and efficient treatment the period of hospitalisation will be reduced to a week or so, while inefficient treatment may prolong that period to many weeks or months, or lead even to eventual discharge of men from the Army with the complaint still uncured. This, then, is the excuse, if such be needed, for venturing to discuss these somewhat banal subjects.

Devonshire-place, W.

## BLINDED SAILORS AND SOLDIERS : REMARKS ON THE TRAINING AT ST. DUNSTAN'S.

By ARNOLD LAWSON, F.R.C.S. ENG.,

OPHTHALMIC SURGEON AND LECTURER ON OPHTHALMIC SURGERY,  
MIDDLESEX HOSPITAL; OPHTHALMIC SURGEON TO  
ST. DUNSTAN'S HOSTEL.

THE fact that the great war rapidly developed largely into a trench warfare has caused head injuries to figure very prominently in the casualty lists. One of the after-consequences of many of these head injuries is partial or complete loss of sight, and as a result the war had not been many months in progress before a number of discharged blinded soldiers were thrown on to the nation's charity. As in many other matters the nation was not prepared for this state of things, and St. Dunstan's was the first, as it has now grown to be the final and complete, answer to the urgent cry for help from the sufferers. Everybody now knows that St. Dunstan's was initiated, put into being, and carried on to what it now is by the self-devotion and genius for organisation of Sir Arthur Pearson, who has given the whole of his marvellous energies, and incidentally has largely sacrificed his health, to perfecting a scheme for the training of blinded soldiers and sailors.

St. Dunstan's started just a short 22 months ago in a large house in the Bayswater-road. Thence in March, 1915, it moved to its present quarters in Regent's Park, where on the 15 acres of available land it now lodges about 180 men, and here the greater part of the training is carried out. But St. Dunstan's stands for much more than this. It now includes the Regent's Park College, recently made over by the generosity of the Baptist College Committee, with its possible accommodation for about 200 more men. In addition two large houses in Portland-place serve as accommodation for blinded officers, and two houses in Paddington are also being used to lodge some of the men for whom there is no available space at St. Dunstan's for the moment. Further, four convalescent homes (two at Brighton, one at Blackheath, and one at Torquay), with accommodation between them for 112 patients, serve a most useful purpose in providing the men with week-end and longer trips to rebuild their health. These homes have proved a very great boon, as numbers of the men suffer a great deal from headache and malaise long after their wounds have healed.

Moreover, the work at St. Dunstan's does not end with the training of the men, but purposes to settle them after training—i.e., to provide homes for them, to set them up in business, and to supervise them after settlement. Thus the

"settlement" and "after-care" departments of St. Dunstan's have grown into a great and responsible undertaking, and the work is of necessity very rapidly increasing. It is a work which requires great organisation, and already has advanced to the stage of portioning the United Kingdom into districts, each with its own supervising secretary and branch establishment.

At the present moment there are 388 blinded soldiers and sailors on the books at St. Dunstan's. Of these, 280 are actually at St. Dunstan's or its attendant convalescent homes, whilst 108 are in hospital either waiting admission or sent into hospital as requiring medical treatment in some form.

For the purposes of admission a man is considered fit whose sight is so injured that he is incapable of leading an independent existence. There are many, therefore, who can distinguish light, though a large majority are absolutely blind. A difficulty has existed in regard to a certain number of cases which are partly or wholly functional—cases of bad "shell shock," as it is loosely called, for example. To sift and apportion the functional and organic elements in many of these cases is a matter of great difficulty, and to train a purely functional blindness as if it were an organic blindness may be the worst possible treatment. However, ways and means have generally been found to deal with these cases, and the convalescent homes have proved very valuable adjuncts in helping to the right decision.

The great factor in the success which has attended St. Dunstan's is the youth of most of the patients. It is far better to go blind young than to lose sight after middle age. The buoyancy of youth, its power of repair, mental as well as physical, and its inherent faculty of living in and for the present without undue inquiry into a remote future, make it possible for blinded youth quickly to pick up the severed threads and start life again. Such elasticity is out of the reach of the aged, and consequently the training of the youthful blind is far easier and far more gratifying in its results than training applied to the old.

At St. Dunstan's the men are all taught to shun self-pity. Commiseration is avoided, and from the start the man is encouraged to accept his lot as an inconvenience and not as a disability. He has got to make the best of it, and the best is a very good one if it is learnt aright. A visit to St. Dunstan's at any time will speedily assure the stranger that this spirit is quickly and cheerfully accepted, for there is no cheerier place in London.

Another and equally important point in the training is the teaching of independence. The blind man instinctively becomes increasingly dependent on others if left to himself, and the greatest pains are taken at St. Dunstan's to show the men how to shift as far as possible for themselves. Various simple devices are adopted and after a very short stay the man will be found cheerily going about his own business without a thought of seeking outside help. A more subtle difficulty is the natural "suspicion" of a blind man. Everybody instinctively gauges the value of a word by watching the speaker, and the loss of this faculty of watching weighs very heavily on many blinded people. The feeling of distrust soon wears off at St. Dunstan's in the life of good fellowship amongst others similarly handicapped, aided by the inspiration afforded by the experiences of those who have lived at the hostel for some time.

The actual training of the men occupies a work day of four hours, two hours being given up daily to learning Braille and typewriting, and two hours to the learning of handicrafts or trade. The hours are not long, but the blind man has to visualise everything mentally, and has consequently to concentrate intensely upon all his work. Thus the blind man gets tired much more quickly than the sighted man even when "fit," and very many at St. Dunstan's are anything but "fit." Typing is quickly learnt, and if an "efficiency" test is passed the man on leaving the hostel is presented with a Remington typewriter. Braille presents many difficulties to the older and to the more uneducated men, as also to a good many of those who have had severe head injuries. I am in hopes that a simplified Braille may be devised to meet this need. For a selected few massage, poultry farming, and telephoning form very suitable occupations; but these are not for the majority, who are set to learn simpler things, such as mat-making, basket- and hamper-making, carpentering, or cobbling. Two of these rougher trades are usually learnt by each man. The average time occupied in

the training is from six to eight months, but illness often causes an extension of the period needed. In any case the man is kept until he is thoroughly well qualified to start life again on his own account. Up to the present time 150 men have been fully trained and settled.

To keep the men in good physical condition much care is taken. Early morning Swedish exercises in the open air in the summer and indoors in the winter, and rowing on the water of Regent's Park form very good aids in this direction, whilst a number of voluntary workers come to give the men good walking exercise each day.

The social side of the hostel is abundantly looked after. There is a very large social hall where some form of entertainment takes place nearly every evening, and, further there has recently been added a very large "quiet room," fitted with easy chairs where the men can resort for a quiet smoke and rest. A chapel, too, has just been completed, and its services will undoubtedly prove of great comfort to the men.

The maintenance of general order and discipline sounds a formidable matter, but on the whole the difficulty has been less than anticipated. A great deal is done by appeals to the honour and good sense of the men themselves, the vast majority of whom realise the essential necessity of order and give offenders against the rules a very poor time. At the same time, it is very easy for one or two bad characters to upset thoroughly the whole place, and it has been found necessary in a few instances, and after due warnings, to get rid of the offender.

Harley-street, W.

## Clinical Notes: MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

### A CASE OF INTESTINAL OBSTRUCTION BY THROMBOSIS OF MESENTERIC VEINS; OPERATION; RECOVERY.

By S. C. GHOSE, M.R.C.S., L.R.C.P. LOND.,  
HOUSE SURGEON, ROYAL ALBERT HOSPITAL, DEVONPORT.

THE following case may be deemed of sufficient interest to merit publication.

The patient, aged 54, a labourer's wife, habitually constipated, was suddenly seized with severe abdominal pain, referred to the right of the umbilicus, a pain which "doubled her up." The condition passed off, only to return soon after, followed by vomiting and arrest of the passage of flatus and faeces, which state continued till she was admitted into the hospital after three days. During that time she was treated outside for intestinal obstruction by Dr. T. N. Leah, as she refused early surgical treatment.

On admission the temperature was 97° F., the pulse-rate 80, and the respirations 26, and on the following morning they were 98.4° F., 116, and 28 respectively. The abdomen was slightly distended with gas, and vomiting was very frequent and faecal-smelling. There was no visible peristalsis. Nothing was found per rectum or per vaginam. A soap enema, followed in three-quarters of an hour by a turpentine enema, was administered without result. The patient was prepared for operation and the stomach was washed out.

On the fourth day after the onset of illness a laparotomy was performed by Dr. Leah. About 12 inches of distended small gut with attached mesentery was found to be of a deep chocolate colour, just above a constriction ring, beyond which the gut was perfectly healthy. The attached mesentery was soft and oedematous and gave way on manipulation with some haemorrhage. No band, adhesion, tumour, or ulcer was found to account for the constriction ring. No peristalsis was visible in the affected area. Some peritonitis was present. The attached mesenteric veins were found to be thrombosed. The affected area of the gut was re-ected, and end-to-end anastomosis was established by simple sutures, closing the abdominal wound in four layers, the whole operation taking about an hour.

The patient ten days after the operation was getting on well, although she had been troubled with vomiting, meteorism, and great thirst during the early part of the after-treatment. She left the hospital perfectly cured five weeks after the operation, and is doing light work at home.

I am indebted to Dr. Leah, surgeon to the hospital, for permission to publish the case.

### A CASE OF APPARENT DISAPPEARANCE OF CARCINOMA OF CERVIX.

By EDWARD C. B. IBOTSON, M.D. LOND., &c.,  
TEMPORARY LIEUTENANT, R.A.M.C.

A PAPER read before the Section of Therapeutics and Pharmacology of the Royal Society of Medicine in 1909 by Mr. Wippell Gadd and another author stated that the violet leaf contains a glucoside (viola quercitrin), which is an anti-septic and has the property of easing the pain and lessening the discharge of uterine cancer and also of keeping the urine sweet for a long period after it had been passed, but they did not find that it had any curative effect. The fact that in the following case the nodules disappeared from the scar on the thorax is very remarkable. How far it was due to the violet-leaf infusion combined with other measures and how far it might be considered a temporary or permanent disappearance of carcinoma is difficult to say, but the case seems one worthy of recording.

The patient, a married woman aged 45, had her left breast amputated for cancer in 1914 at Liverpool, and has been under my observation ever since. In July, 1916, symptoms of uterine cancer appeared, and also nodules developed in the operation scar. Offensive vaginal discharge tinged with blood, obstinate constipation and vomiting, painful and difficult micturition, and pain in the left sciatic nerve area. Another medical man, Mr. W. R. Williams, Machynlleth, saw her with me in August and agreed that there was extensive ulceration of the cervix, carcinomatous in character, and that the uterus was fixed in the pelvis and appeared bulky. We agreed that she was too weak to stand another operation so extensive as hysterectomy, and that palliative treatment combined with enemas and vaginal douches was all that could be done. I also suggested vaginal injections of infusion of wild violet leaves, and that the patient should also take a little infusion of the violet leaves internally. This has been persevered with, and she has steadily improved. The nodules in the scar disappeared in September and I can find nothing abnormal in the cervix, and the uterus is now freely movable. Also the constipation and vomiting have quite ceased. She has still pain in the left sciatic nerve area, and is exceedingly thin, as indeed she always has been. But she is taking plenty of nourishment and the pain in the nerve is not so great as to require morphine. She sits up in a chair daily.

Corris, North Wales.

### A CASE OF SARCOMA OF FOURTH VENTRICLE.

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THE following case presented unusual features, clinical and pathological, and is reported in the hope that the notes may be found useful by others who have to deal with similarly misleading clinical conditions.

The patient, a girl aged 14, was admitted to the Royal Sussex County Hospital, under Lieutenant-Colonel E. Hobhouse, about the middle of July, 1916, with a history of having had "meningitis" some months previously. Apparent complete recovery from the "meningitis" occurred, but since that time the patient had occasional periods lasting a few days, during which she appeared to be in a state of coma. In the intervals she appeared to be practically normal, and at no time was there headache, vomiting, paralysis, or any physical sign suggesting the presence of tumour. This naturally led to the suggestion that possibly the condition was hysterical in origin. Death occurred on August 8th, during one of the spells of coma, and the question of cerebral tumour was raised definitely, although as a possibility this had not been lost sight of all along.

*Post-mortem.*—A soft tumour about the size of a large walnut was found, apparently originating in the valve of Vieussens and separating rather widely the two lateral halves of the cerebellum. There was no definite pressure on the floor of the fourth ventricle, and the lateral ventricles of the brain were not distended. The tumour showed several comparatively large recent areas of haemorrhage within it. In structure it was, histologically, a small round-cell sarcoma. There was no visible stroma, and no gliomatous elements. The cerebral and cerebellar tissues were normal in structure and all the other organs of the body were normal.

The absence of practically all symptoms except recurrent coma made the case a very difficult one to diagnose. On the other hand, this coma was rightly looked upon as a grave symptom, and the patient was kept in hospital in spite of the intercurrent, apparently normal, spells.

Brighton.

## Medical Societies.

### ROYAL SOCIETY OF MEDICINE.

#### SECTION OF ELECTRO-THERAPEUTICS.

##### *History of the Electro-Therapeutic Department of St. Bartholomew's Hospital.*

THE monthly meeting of this section was held at St. Bartholomew's Hospital on Jan. 19th, and took the form of a clinical evening to enable members to inspect the electro-therapeutic department of the institution. Dr. G. HARRISON ORTON, the President, occupied the chair.

Dr. E. P. CUMBERBATCH, who has charge of the electrical department, read a paper on the history of the department and its work. This did not include the X ray section, which is under the superintendence of Dr. Hugh Walham. The department was founded in 1882. Prior to that date ordinary electrical treatment and testing by faradism and galvanism were carried out in the wards by the house surgeons and dressers. The equipment at the commencement was a very modest one—waiting-room, testing-room, a room for electrolysis, and a bath-room containing a single bath, which for years remained the only electric bath in London. There were three batteries, each containing 50 cells. During the first year 55 in-patients were treated, the cases including paralysis, hysteria, ankylosis of joints, sciatica, epithelioma, and caruncle—the latter for destruction by electrolysis. In the years 1883-5 269 inpatients were treated and 876 out-patients. In 1891 Dr. Stephenson died and was succeeded by Dr. H. Lewis Jones. In 1896 the first skiagram was taken in the hospital, and since then the amount of X ray work had increased yearly. Dr. Lewis Jones's work in the department was very devoted and thorough until his retirement in 1912; indeed, since 1891 the history of medical electricity was closely interwoven with his writing and teachings, and the position occupied by the specialty to-day was largely due to him. Previously there was much obscurity among physicians as to the scope and limitations of electricity in medicine. In 1916 497 new patients were admitted, of whom 284 were cases of disease or injury of the nervous system, mainly peripheral, and for testing. For paralysis the sinusoidal current was generally used, the paralysed parts being immersed in electrified water-baths. This had been in use for many years and produced good results. For 64 cases of neuritis, 186 operations under anaesthesia had been performed. For cavernous neuritis he (Dr. Cumberbatch) found electrolysis gave the best results, the skin undergoing the least damage thereby. CO<sub>2</sub> snow, diathermy, or the cautery, if effective, destroyed also much underlying tissue. CO<sub>2</sub> snow reserved for capillary naevi when situated on the trunk or limbs over soft parts. There were also treated in the same time 49 cases of disease of the skin, including 11 of rodent ulcer. Joint cases by occasional attendance were able to secure a decrease of pain and increased movement. There had been but few cases treated in the department of alimentary, vascular, and genito-urinary diseases. Gynaecological cases were not received there. Most of the cases were sent by officers of the hospital and by private practitioners. He was fortunate in the fact that most of the cases he received were suitable ones for electrical treatment; some were only sent because many other treatments had been tried without avail, and by those medical men who appeared to regard the electrical department as a refuge for the destitute. Many cases which were eminently suitable for such treatment, however, did not reach that specialty, and he felt that electricity was not yet occupying the position in medicine to which it was entitled. The reasons for this were, he submitted, three in number: (1) Lack of knowledge on medical electricity by the bulk of practitioners; (2) prevalence of incorrect knowledge on the subject; and (3) the carrying out of electrical treatment by unqualified and unsuitable people. In regard to the first of these, medical students did not attend the electrical department, because they were interested entirely in passing their examinations, and in the M.B. examinations no questions were asked on this subject. Under the second heading, the bulk of practitioners continued in the belief that electricity was for cases which were incurable by other means. Many

institutions existed for turning out, armed with a certificate, men intended to carry on unqualified practice, grossly ill-fitted though they were for practising medical electricity. Much improvement in regard to medical students could not reasonably be expected so long as the examinations did not include questions on the specialty. He had not had one student in the department while it had been under his charge. There should be a wider knowledge as to the kinds of cases suitable for electrical treatment and to this end he advocated the exhibition of lists of such conditions in the waiting-rooms. He also recommended that the X ray work should be in a separate department from that for electro-therapeutics, a method now in operation at the 1st London General Hospital, where only two forms of current—the sinusoidal and the direct—were allowed. At the Miller Hospital, Greenwich, the same separation of departments was in operation.

Dr. R. ARMSTRONG-JONES, who entered the hospital 40 years ago, when Dr. Stephenson was house physician, spoke of the benefit which subjects of dementia precoox derived from an electrical bath for 20 minutes twice a week at Chelbury Asylum. This experience was embodied in Dr. Lewis Jones's well-known book on medical electricity.

Dr. W. J. TURRELL referred to a Dr. Stephenson who practised 100 years before the Dr. Stephenson to whom Dr. Cumberbatch adverted, and who in his M.D. Edinburgh thesis described the static breeze. He confirmed the remarks as to the great help given by the late Dr. Lewis Jones to a fuller recognition of the claims of medical electricity by the profession. One of the most potent steps towards this recognition was taken when medical men themselves were treated by this means.

Dr. JAMES METCALFE Dr. AGNES SAVILL, and Dr. HOWARD HUMPHRIS also discussed the paper, the general expression being in favour of not regarding irregular practitioners as competitors, but of so maintaining the specialty at a high level, while striving to make new advances, that the public would come to see it was in their own best interests to consult recognised authorities.

Dr. CUMBERBATCH replied.

**WEST LONDON MEDICO-CHIRURGICAL SOCIETY.**—A pathological meeting of this society was held on Feb. 2nd, Dr. A. Saunders, the President, being in the chair.—A paper was read by Dr. A. K. Gordon on the Clinical Significance of Laboratory Tests for Syphilis.—Dr. J. A. Shaw-Mackenzie showed specimens demonstrating the Action of Copper Salts on Protozoa.—Specimens were also shown by Mr. Aslett Baldwin, Dr. Bamford, and Dr. H. H. Sanguineti, and skiagrams were shown by Dr. Reginald Morton.

**LONDON DERMATOLOGICAL SOCIETY.**—A meeting of this society was held on Jan. 16th, Dr. W. Knowsley Sibley, the President, being in the chair. The following clinical cases were shown:—Captain W. Griffith, R.A.M.C., exhibited a case of Kaposi's Disease. Captain P. Carney, R.A.M.C., gave the following description of the case: A Canadian soldier, aged 20 years, who had worked in the open all his life, either as a labourer or a carpenter, developed a general pigmented condition of the skin of the face, accompanied by warty growths and marked telangiectasis. Some of the lesions had been removed by excision, others were treated with radium. After this treatment the lesions became inflamed and very painful, but eventually dried up and completely disappeared. He described the history of the disease as being first a macule, then a papule followed by a warty growth, accompanied with ulceration. There was no family history.—Dr. Morgan Dockrell brought forward a case of Xeroderma Pigmentosum, as described by Kaposi.—In contrast to the above cases Dr. J. L. Bunch brought forward one of von Recklinghausen's disease in a female, which was of 15 years' duration, the tumours, which varied in size, were universal in distribution and slightly pigmented; also a case of Strychnine Rash in a man aged 51, and a case of Epithelioma affecting the dorsum of the right hand in a man aged 66.—Captain Griffith also exhibited a case which he described as syphilis and psoriasis.—Mr. C. H. Mills said that he had an opportunity of seeing several cases of psoriasis in which syphilis had come out on the top; the blood in these cases had been tested and a positive Wassermann reaction obtained in what appeared to be acute cases of psoriasis.—Lieutenant-Colonel L. W. Harrison, R.A.M.C., said that the Wassermann reaction in these cases

was an extremely important point, and he described the present tests that were being used in the various laboratories as being too light in value. In these conditions, he said, it was extremely likely to get positive Wassermann reactions in such cases as Mr. Mills had described; his own modification of the test, being less delicate, had been designed to escape these errors, as a strong reaction was demanded and not simply a positive manifestation.

## Reviews and Notices of Books.

### *Encyclopædia Medica.*

Second edition, under the General Editorship of J. W. BALLANTYNE, M.D., C.M. Vol. IV. Ear to Filariasis. London and Edinburgh: W. Green and Son, Limited, 1916. Pp. 685. Price 20s. net.

An encyclopædia is a hard nut for a reviewer to crack, but the fourth volume of this great work gives us the opportunity of reviewing a series of articles on kindred subjects. The articles on the ear occupy a quarter of the volume and furnish a good instance of the associated strength and weakness of the encyclopædic method. The inevitable inequality of performance is balanced against the excellence of some of the articles. The single editorship is not enough to pull together the loosely strung contributions into a whole. The publisher's part is excellent, illustrations are good, plentiful, and modern, although the prehistoric old woodcut on p. 4 is out of place.

Of the several articles we welcome especially those on otosclerosis and on the labyrinth and eighth nerve. Both are thoroughly up to date, and that on otosclerosis may be said to be almost in advance of its text-book time. The labyrinth and eighth nerve are treated in genuinely encyclopædic style, and a most satisfactory article results. The weak spot lies in the articles on inflammatory diseases of the ear. Here there is too much overlapping between the writers of the "acute" and "chronic" articles, while the treatment of chronic middle-ear suppuration and its sequelæ is almost startlingly inadequate. The whole article only occupies 35 pages. The radical mastoid operation takes three-quarters of a page; the only two flaps for the plastic operation on the meatus mentioned are those of Panse and Milligan, neither, we believe, in general use, while no mention is made of Ballance's flap, probably the most widely used and generally useful of all, apart from its historic claims. In the portion of the article devoted to meningitis we find no mention of Babinski's sign, no mention of jerks, knee and other, nothing said of neck-stiffness or of the abdominal reflex. Kernig's sign is spoken of as if it were a matter the writer had heard of but had not experimented with. This part of the article is punctuated with loose expressions, such as "lumbar fluid," "antrectomy," "pia arachnoid cavity," and later, under lateral sinus thrombosis, the sentence, "the occurrence of a rigor, or series of rigors, followed by an attack of shivering," leaves the reader in doubt as to what constitutes a rigor in the mind of the author.

The article on chronic catarrh of the middle ear is thoroughly sound and sensible, and if the writer has nothing very fresh to say, at all events he gives no encouragement to overmuch tinkering. Attention might, however, have been more firmly directed to the treatment of the antecedent causes which are quite justly enumerated. The introductory "examination of the ear" is thorough, clear, and modern, and is one of the best articles of the series.

### *Les Appareils Plâtrés.*

By JACQUES CALVÉ and MARCEL GALLAND. With 109 illustrations. Paris: Baillière et Fils. 1917. Pp. 88. Price fr. 2.50.

THIS little volume is the first of a series of French practical handbooks to be produced under the editorship of Dr. Calvé and Dr. Lamy. As the authors state in their preface, their aim is to give practical instruction, and in this they have succeeded admirably. Plaster-of-Paris, while of universal use in this country, is not employed with us to the same extent as it is in France, and few English practitioners are aware of the skill which French surgeons have acquired in its uses.

The volume is divided into three parts: (1) The making of the plaster apparatus; (2) the orthopaedic principles requisite for immobilisation; (3) special technique in the application of plaster to various conditions. In the first part the manufacture of the plaster apparatus is described lucidly and with special attention to practical requirements. Reversing, in applying a plaster bandage, is condemned, and in its place Ducroquet's pleating manœuvre, which has incontestable advantages, is described in detail. Great stress is rightly laid on the importance of correct and accurate moulding, and full directions to secure adequate moulding are detailed. Attention is drawn to the accidents which may arise in the application of plaster, and their appropriate remedies are indicated. The disadvantages of plaster are briefly discussed and dismissed. There is little to criticise but much which may be commended. The directions given are terse, clear, and essentially practical. Part 2 is devoted to the orthopaedic principles involved in immobilisation by plaster apparatus. Brief and to the point, this section well repays perusal, and its study will prevent many errors commonly seen and easily avoided. The third portion is directed to special technique. The clearest instructions are given with restraint and brevity. Naturally considerable attention is directed to the application of plaster-of-Paris in tuberculous disease of the bones and joints. The authors still favour the use of the "Minerva" in cervical caries. While this appliance is certainly efficient, it is uncomfortable and not altogether devoid of danger. Alternatively preference might be given to a high plaster jacket with a frontal band which would render unnecessary immobilisation of the chin and leave the throat free. The use of the Minerva is not to be commended to the inexperienced. This, the most difficult of all plasters to apply successfully, not unnaturally attracts the ambition of the tyro, and failure in its application may result in his discouragement and be a source of danger to the patient. It should be reserved for the expert only. A short article is devoted to the Abbott jacket as used in cases of scoliosis, and attention may be drawn to an ingenious method for introducing the felt pads employed.

We have made some minor criticisms on what appears to us to be a thoroughly practical and useful handbook. Parts 2 and 3 might, we think, advantageously be expanded in later editions. The illustrations are numerous and carefully selected and enhance the value of the text. The volume should be in the hands of all house surgeons and senior students, and may be consulted with advantage by medical men called upon to use plaster-of-Paris. It supplies a real need and should certainly do much to popularise the use of plaster amongst those not too prejudiced to appreciate its advantages. Incidentally it should help to familiarise the student with the French technical terms and make for a highly desirable medical entente.

### *The Catarrhal and Suppurative Diseases of the Accessory Sinuses of the Nose.*

By ROSS HALL SKILLERN, M.D., Professor of Laryngology, Medico-Chirurgical College. London and Philadelphia: J. B. Lippincott Company. Pp. 418. 21s. net.

Professor Skillern's handbook on the catarrhal and suppurative diseases of the accessory sinuses of the nose was first published in 1913, and has now reached its second edition. Although the entire work has undergone a systematic revision, the original plan of the work has not been changed. The subject is dealt with in six parts. The first part is given up to general considerations; the next four parts to the maxillary, the frontal, the ethmoidal, and the sphenoidal sinuses respectively, whilst the last part deals with multiple or pansinusitis. Repetition occurs in several places, but this obviates frequent references to other portions of the book.

The greater part of the changes consist of amplification, amongst the more important of which are the following: The treatment of sinus disease in children; the use of the naso-pharyngoscope in the diagnosis of obscure conditions in the sphenoidal and posterior ethmoidal regions; and a compilation of the American mortalities following the Killian operation on the frontal sinus. The number of pages has not been materially increased. The book is profusely illustrated with 247 figures in the text and five coloured plates. It contains a good index and nearly 600 references to other authors, which make it a handbook for the student and a work of reference for the teacher.

# THE LANCET.

LONDON: SATURDAY, FEBRUARY 10, 1917.

## Economy in Food.

ON Tuesday last Mr. NEVILLE CHAMBERLAIN, in launching his scheme for National Service, alluded to plans, not yet complete, to ensure "that doctors are so mobilised and distributed that the needs of both the civil population and the Army can be met." The announcement will cause surprise to no reader of our columns, and comes at the right moment, when not only is general service seen to be the duty of citizenship, but when the nation is receiving for the first time official instructions to reduce the food consumption. Coincident with the publication of a statement on the whole subject by Lord DEVONPORT, the Food Controller, a report has been published on the food-supply of the United Kingdom, drawn up by a committee of the Royal Society at the request of the late President of the Board of Trade, Mr. RUNCIMAN. This was issued on Feb. 2nd. The signatories include the following: Dr. A. D. WALLER, professor of physiology in the University of London (chairman); Dr. W. L. ASHLEY, professor of commerce in the University of Birmingham; Mr. A. W. FLUX, of the Board of Trade; Mr. A. D. HALL, Development Commissioner; Dr. F. G. HOPKINS, professor of bio-chemistry in the University of Cambridge; Mr. T. H. MIDDLETON, Board of Agriculture; Dr. D. NOEL PATON, professor of physiology in the University of Glasgow; Dr. W. H. THOMPSON, professor of physiology in the University of Dublin; and Mr. T. B. WOOD, Drapers Professor of Agriculture in the University of Cambridge. The report is divided into three parts, which deal respectively with the food-supply of the country throughout the period of five years preceding the war; the food-supply in 1916; and the methods by which our available sources of food can be developed, utilised, and organised. It is a valuable document, which can be obtained at the Stationery Office or through any bookseller for 4d., and should receive the close study of the medical profession, who ought to be in a position to give advice to caterers, public or individual, upon the minimum requirements of food and the sources of energy production.

Turning to the statement by Lord DEVONPORT, issued on the same day as the report of the Committee of the Royal Society, we find that the Food Controller has published a clear warning declaring the existing need for food economy. At the outset the nation is asked by the Food Controller to economise voluntarily and with individual patriotic effort. If the response comes in the wholehearted way that Lord DEVONPORT hopes, compulsory rationing may be avoidable. Otherwise a compulsory system may have to be

established. The curtailment of the nation's food consumption, by whatever method it is adopted, is, in his opinion, urgent, and a real and serious attempt has got to be made in the very near future by every individual to reduce, where it is possible, his or her food allowance. The suggestion is to give up extravagance and waste rather than to relinquish actual necessities, and this opens up the subject which for long has been a matter of debate amongst physiological authorities, as to what constitutes an actual necessity. Lord DEVONPORT appeals not so much for actual sacrifice of bodily needs as for a self-imposed restraint, a practice of frugality which will ensure, he says, a sufficient supply for all. The irreducible dietetic minimum in terms of food commodities at once comes into question. Guided, no doubt, by the weight of physiological evidence and opinion at his disposal in the report to the Board of Trade, the Food Controller has put forward examples of allowances in the shape of the three staple foods—bread, meat, and sugar. After consideration of available stocks and probable means of obtaining future supplies, the situation requires, he says, that heads of families should endeavour to limit themselves to the weekly purchase for each person comprising the household of the following quantities per head per week: bread, 4 lb. (or its equivalent in flour, 3 lb., for bread-making, &c.); meat, 2½ lb.; and sugar, ½ lb. These foods are taken by him to be the cardinal factors of the situation, and it is stated that though the above quantities will form the basis of the dietary scale they will naturally be supplemented by other food products. This is an important qualification. So far, there is said, for example, nothing about barley, oats, fruits, milk, cheese, butter, and so forth, but meat includes poultry, game, bacon, sausages, and tinned meat. The ration of meat is calculated by weight as supplied by the butcher, and includes bone and fat. It is believed that a resolute effort on the part of each consumer to reduce consumption by at least 1 lb. of bread or ½ lb. of meat per week, or both, will automatically bring about a saving of over 1,000,000 tons per annum of these foods.

It is early yet to deal adequately with the physiological side of Lord DEVONPORT's proposals as they are not complete; so far they disclose only a general policy as regards the three staple commodities—bread, meat, and sugar. We recommend all our readers to consult the article by Dr. EDMUND SPRIGGS, published on p. 234 of this issue of THE LANCET, for valuable information on the subject. The question whether the daily amounts of these foods are dietetically sufficient will no doubt be discussed, as well as the allowances made in regard to supplementary articles of food. For example, when we consider in a diet the values of protein, carbohydrate, fat, and mineral substances, one or other or all of these could be presented to us in other foods not mentioned in Lord DEVONPORT's proposals, but not so obviously the staple foods of this country, while their supply is to a great extent an unknown proposition. The nation is perfectly willing to participate in a scheme involving any

self-denial which is a help and aid to those fighting for us on land and sea, and the authorities are now prepared to make clear what is expected of the people. Lord DEVONPORT has undertaken to inform the public how to economise and how to adjust individual needs to the situation as they may develop. A staff has been organised having for its object to guide the people in its eating, and weekly notices of instruction and advice will be issued. The scheme is sound enough as regards its aim, and the definite proposals made should secure immediate adherence, though everyone can see the direction in which they will press hardy. The economy in flour is drastic. The details have yet to be discussed, and probably adjustments based on the representations of scientific and economic authorities will receive careful consideration. Concerning the co-operation of the nation no misgivings need be entertained.

### National Health in 1915-1916.<sup>1</sup>

IN presenting his review of the national health in 1915-1916 Dr. NEWSHOLME discusses certain difficulties resulting from the conditions of war which have continued substantially unimproved since August, 1914. Among these difficulties he mentions, first, the serious disturbance which has affected local populations, in consequence of which the uncertainty necessarily attaching to local estimates has been greatly increased. Secondly, he refers to the creation of gigantic war industries throughout the country, which are not aimed at the national requirements after the war. At least a partial solution of the population difficulty—complicated as it has been in the past by the duplication of areas—was supplied at the recent Census by the substitution of the administrative for the registration or Poor-law area as the unit of tabulation for official purposes. By this means the statistical returns of the local medical officers of health as well as those of the Central Office at Whitehall are brought into line with the national records of Somerset House. Since the outbreak of war the work of the medical staff of the Local Government Board has centred chiefly around the military position, and this is especially true with reference to the second year of war, now under review. In his previous annual report Dr. NEWSHOLME gave account of the measures taken to safeguard the public health under exceptional conditions, as well as of the detailed co-operation arranged between the military and civil authorities. The efficiency of the collaboration is established by the present report, and admitted by the War Office. It will, we hope, be further enhanced as a result of Mr. NEVILLE CHAMBERLAIN's statement that the mobilisation of the whole medical profession is under consideration.

During 1915 a special visitation of military camps was undertaken by the medical inspectors of the Board in conference with the military

and civil sanitary officers, the medical inspectors being further engaged in discussing with their military colleagues the serious problems of camp water-supplies and sewage disposal. Throughout the year the local sanitary authorities have provided liberal accommodation in civil isolation hospitals for soldiers suffering from infectious disease. Similar preventive measures have been arranged for with the Admiralty, the medical staff of the Board having collaborated with the Admiralty officers in the inspection of naval camps and billets. Striking evidence of the success of such continued effort is furnished by the fact emphasised by Dr. NEWSHOLME that, with the sole exception of measles, communicable diseases have shown no increase during the year. The weekly incidence among military and civil populations respectively of cases of measles, enteric fever, and cerebro-spinal fever are given in the report, and the distribution in both populations of poliomyelitis is also set out. The prevalence in England and Wales of the latter two diseases forms the exception in a yearly record of infectious diseases which was otherwise favourable. Although it is known that half the children recently born still remain unprotected by vaccination, it is noteworthy that small-pox has hitherto failed to gain more than a temporary footing in any part of England. Most of the 78 cases reported during the year were definitely traced to imported infection from elsewhere. In every case the local provision for isolation seems to have been effective in preventing extension. One of the commonest accompaniments of prolonged warfare is dysentery. Unless this contagious and recurring disease, as it occurs in the field, is treated under satisfactory conditions it is liable to cause widespread mischief amongst civilian populations. It is satisfactory to learn that owing to the strenuous precautions adopted by the Army medical staff very few instances have arisen in which the disease has spread outside the military hospitals containing dysentery patients. Notwithstanding the return to this country of many soldiers recovering from dysentery, the disease is nowhere reported to have prevailed epidemically. Neither has typhus fever acquired a foothold in this country, either among the military or the civil population, in spite of the fact that the disease has been prevalent during portions of the last two years in Serbia and in certain parts of Russia as well as in several of the prisoners' camps in Germany. The infection is known to be communicated chiefly by means of body lice, and the conditions of life in camps and close billets make pediculosis difficult of control. It is therefore satisfactory to hear that the return of many thousands of troops from the various fronts has not been accompanied by spread of typhus at home. The country has also remained free from plague and from Asiatic cholera.

The best criterion of the sanitary condition of a community undoubtedly consists in the prevalence or absence of enteric fever. In 1915 the amount of this disease was so slight as to inspire hope

<sup>1</sup> Supplement to the Forty-fifth Annual Report of the Local Government Board : Report of the Medical Officer.

that enteric fever, like typhus, will ere long become practically extinct in this country. There has been in recent years a remarkable decline in the notifications of enteric fever, the numbers having fallen from 13,000 in the year 1911 to 6000 in the year under review. The extent to which decline has taken place will be appreciated from the fact that even so recently as 1893 enteric fever caused 6801 deaths, a larger number than the total of cases of enteric sickness notified in 1915. The three counties showing the highest prevalence of enteric fever are Durham, the West Riding of Yorkshire, and Northumberland, the incidence being greatest in crowded centres of population, or where elementary sanitation is notoriously defective. Cerebro-spinal fever showed exceptional activity in the year 1915, and special work was undertaken by the military and civil staffs to control its spread and to investigate its causes, in the hope that completer knowledge would lead to prevention. In his remarks on the war in relation to cerebro-spinal fever the Medical Officer to the Local Government Board mentions the occurrence of 1146 military cases in England and Wales, excluding cases originating overseas. Among the civil population 2566 attacks were notified in the year under review, as compared with 315 in the preceding year and 279 in 1913. Cerebro-spinal fever prevails chiefly in the earlier months of the year, reaching its maximum incidence in March or April. Acute anterior poliomyelitis occurred in sporadic fashion during the year. In marked contrast to cerebro-spinal fever poliomyelitis is essentially a summer disease, and although in this country the disease has never assumed epidemic proportions, it occurs here annually in considerable amount. In 1915 the reported cases numbered 517, as against 509 in the previous year, and 744 in 1913. From inquiries concerning local outbreaks but little evidence emerges of the spread of infection from person to person, but this is a line of investigation that no doubt awaits pursuit when the personnel of the Local Government Board is less depleted. Despite the shortage of officers, however, the control of pulmonary tuberculosis has received special attention during the year. In certain districts the entire staffs of tuberculosis officers have been detached for military service, their places being often taken by female medical officers or by general practitioners. The number of beds available in residential institutions for the treatment of this disease exceeded 11,000 in the spring of last year. This number would have proved insufficient but for the fact that tuberculous persons enjoying the high wages of war-time have frequently been unwilling to submit to isolation in sanatoriums. In the majority of counties there is still a shortage of hospital beds for advanced cases of phthisis. It is noteworthy that whenever a soldier is discharged from the service on account of tuberculosis the fact is promptly reported to the medical officer of health of the district to which the soldier is proceeding. In all cases, therefore, tuberculous ex-soldiers are brought under the supervision of the sanitary authorities. With regard

to the compulsory isolation and detention of tuberculous persons, which has been tried at St. Helens and suggested in other places, Dr. NEWSHOLME is of opinion that it would be contrary to the public interest that such powers should be entrusted to a local authority unprovided with an adequate supply of beds for the treatment of advanced cases of consumption.

Public health work is not restricted to the control of disease communicable by infection. It embraces all measures, whether of prevention or of treatment, by which the health of the community may be improved. Second only to the work directly arising out of war conditions the attention of the Board's medical department has been occupied throughout the year in considerations for maternity and child welfare. The need for increased effort to save child life is shown by the perilous fall in the natural increase of the population. In England and Wales during the year 1914 there were 362,354 more births than deaths. In the year 1915 the excess of births over deaths was only 252,201. There were 64,569 fewer births and 45,584 more deaths in 1915 than in the preceding year. The reduction in the number of births emphasizes the importance of saving life and of improving the health of all survivors. "There is no insuperable difficulty," writes Dr. NEWSHOLME, "in reducing the total deaths in childhood to one-half their present number." There are at present in England and Wales about 1000 salaried health visitors, the number having increased by 400 since the commencement of the war. The practicability of extended work of this kind has been increased by the passing of the Notification of Births Extension Act of 1915, which gave to county councils the powers of a sanitary authority for the purposes of the care of expectant mothers, nursing mothers, and young children. About half the county councils and most of the county boroughs have adopted schemes under the Act, and many of these are in actual operation. As an unfortunate effect of the war there has not been an expansion of voluntary work for child welfare to the same extent as of official work, the subscriptions of voluntary societies having fallen off. The urgency for more definite action on the part of public authorities is therefore considerably increased.

### The Control of Cerebro-spinal Fever.

Cerebro-spinal fever has always shown a special liability to attack military forces, and considerable apprehension naturally arose over the state of affairs in this country a few months after the outbreak of war, when hundreds of camps filled with recruits at a susceptible age were scattered everywhere. The severity of the recent outbreaks is well shown in the diagram given by Dr. NEWSHOLME in his report. Early in 1915 it became apparent that an epidemic of this disease was imminent, and the curve reached its maximum in March and April of that year. 2566 civil and 1146 military cases were

reported in the course of the year, as compared with a total of 279 in 1913. In 1916 the epidemic curve reached only about half the height of that attained in 1915, and there is good ground for the hope that 1917 may witness a further decrease. At the outset Colonel W. H. HORROCKS and Colonel R. J. REECE were placed in charge of the military administrative measures for dealing with the disease, and it soon became apparent that bacteriological advice and assistance upon a large scale were required if the epidemic was to be controlled. The Medical Research Committee undertook to provide the scientific assistance required, and placed Lieutenant-Colonel MERVYN GORDON at the head of the bacteriological organisation. A central cerebro-spinal fever laboratory was established at Millbank, where Major T. G. M. HINE assisted, and numerous provincial laboratories were set up at suitable centres. An analysis of the reports from these centres made by a small committee of bacteriologists was published a year ago, and this year Lieutenant-Colonel GORDON issues a report on work done at Millbank, detailing the methods devised for the control of cerebro-spinal fever during the past two years and giving some indications of the results which have already been achieved. To the painstaking experimental work on which preventive measures have been based, and for which great credit is due to Lieutenant-Colonel GORDON and his colleagues, we desire to draw special attention, and, in particular, to two outstanding features of it: (1) the serological recognition of the type of meningococcus as a guide to isolation of positive contacts; and (2) a method for the treatment of such contacts.

The spread of cerebro-spinal fever is by healthy persons who carry the meningococcus in the naso-pharynx, themselves escaping the disease, and it is estimated that some 2 per cent. of the population may be carriers under ordinary circumstances, while at certain times and in certain districts the percentage may be much higher. The proportion of carriers who develop the disease is an extremely small one. Captain SHEFFIELD NEAVE, who writes in this issue of an epidemic in East Suffolk numbering 73 cases, says: "No contacts were known to catch the disease." The insidious mode of spread accounts for the discontinuity usually observed in cases of cerebro-spinal fever, and renders the disease exceedingly difficult to control. More than one type of meningococcus may be concerned in producing the disease, and the term parameningococcus has been introduced for that type which showed serological nonconformity with the classical organism. The first important research undertaken by Lieutenant-Colonel GORDON, after surmounting initial difficulties, was a serological investigation into the strains of meningococcus concerned in the existing epidemic. Taking as his criteria the phenomena of agglutination with specially prepared univalent sera, and in particular the power of absorbing specific agglutinins, he found that the races of the microbe identified in the cerebro spinal fluid in the epidemic of 1915 fell into four groups, which were similarly encountered in last year's epidemic. He

termed them Types I., II., III., and IV., and proved them to breed true and to remain unaltered in their serological characters after a year's culture. In any given case only one type has been detected, and always a single type in both naso-pharynx and cerebro-spinal fluid of a particular patient. The close contacts of a case have also usually harboured the same type as the affected individual. The term "epidemic type" suggested by Lieutenant-Colonel GORDON seems a justifiable one.

The practical difficulty confronting those who were endeavouring to control the spread of the disease amongst the military forces was that the isolation of the numerous positive contacts involved serious interference with the necessary training of healthy men. Now in investigating naso-pharyngeal strains of the meningococcus, both in contacts and non-contacts, it had been seen that quite a considerable proportion of them did not correspond serologically with the epidemic types. It was therefore determined to segregate only those positive contacts who were ascertained to be carrying meningococci of the epidemic types. The reduction in numbers thus effected had the immediate result of rendering practicable the policy of temporary isolation. It may be admitted that this procedure is not perfect, but from the examples given in Lieutenant-Colonel GORDON's report it appears to have met with considerable success. Thus, to quote a single example, Captain R. R. ARMSTRONG swabbed no less than 10,000 men and provisionally isolated 410 as carriers of an organism resembling the meningococcus. Lieutenant W. J. TULLOCH subsequently examined 324 serologically (the remainder having meanwhile become free of the coccus) and was able to release 103 of them on the agglutination results. No evidence came to hand that any single man of this infected garrison passed as negative by Captain ARMSTRONG either developed the disease or passed it on to another. Whilst attended with such success in military practice it is nevertheless obvious that this mode of controlling cerebro-spinal fever is not readily applicable to civil practice.

Having weeded out the probably important carriers, Lieutenant-Colonel GORDON went on to perfect a new method of curing them. While the majority of carriers rid themselves of their meningococci in a week or two, a certain number retain them for weeks or months, and no method of cure has hitherto met with much success. Trials were made by saturating the air of a small room with extremely fine droplets of a disinfectant, as had previously been done by KÜSTER. A Lingner spray was first used, but was later replaced by an apparatus designed by Second Lieutenant E. GORDON, R.E., which proved more efficient and is fully described and figured in the report. The first disinfectant chosen for trial proved the best. It was toluene-sodium-sulphochloramide, briefly known as chloramine-T, a substance prepared by Dr. DAKIN and Professor COHEN in the course of researches upon the mode of action of the hypochlorites. It is non-toxic and does not coagulate albumin. The air so saturated was found to sterilise plate cultures of staphylococci and yet to be tolerated by human

beings for 15 or 20 minutes. A group of 14 chronic carriers received the treatment daily, and all but 3 were cured after at most 13 daily inhalations, though some had been carriers for 10, 12, and even 17 weeks. Later trials were made with zinc sulphate in place of chloramine, but the results were much less satisfactory. Chloramine treatment appears to offer a better prospect of quickly curing the carrier condition than any which has yet been tried. Besides these two important investigations the report contains a large amount of valuable detail, notably in Captain M. FLACK'S report on his work in the London district during 1916. As a whole, it deserves careful study and is encouraging as an earnest of further progress.

## Annotations.

"Ne quid nimis."

### STOCK MIXTURES.

THE advantages and disadvantages of stock mixtures have long been discussed from many different points of view. Teachers and examiners unite in condemning their employment in spite of their convenience. It is often asserted that the use of stock mixtures in hospitals tends to foster careless disregard of many opportunities. Students may get into a habit of writing the name of a stock mixture and yet be profoundly ignorant of all that the name implies. They may occasionally refer to the hospital pharmacopoeia for information, but it is exceptional for them to memorise the full list of the ingredients or the proportions in which they are present in the single dose. Hence the sense of bewilderment which is so often felt when the sphere of activity is changed and the appropriate prescription is required at short notice. Hence also the complaint so often heard from examiners about the lost art of prescribing. On the other hand, there is no denying the practical advantages of stock mixtures for those who have to dispense for large numbers in a limited time. In hospitals with huge out-patient departments it is inevitable that stock mixtures must be used so as to prevent undesirable congestion of work. For the convenience of students the key or clue is the hospital pharmacopoeia, with prescriptions arranged in single doses, and it is left to the dispensing staff to do the necessary calculations when preparing any required quantity of stock.

Viewing the dispensing under the National Health Insurance Act as analogous to a provision for out-patient treatment on an extensive scale, the Insurance Commissioners have issued a revised list of mixtures which are capable of being stocked in bulk without deterioration. According to a note in the *Pharmaceutical Journal*, the revision consists in the adjustment of the proportions of ingredients in each mixture to an 80 fluid-ounce bulk quantity. In other respects this formulary is identical with that issued in the spring of 1916. All medical practitioners engaged in panel practice will have to familiarise themselves with this list, and no doubt will find some interest in endeavouring to calculate back the quantity of each ingredient in a dose of half a fluid ounce. The calculation will be greatly facilitated by bearing in mind the number of grains

in the avoirdupois ounce—namely, 437·5. The list comprises 28 mixtures, and to these names have been given without any definite principle. Sometimes the most important ingredient is mentioned alone; occasionally the names of two appear together. Thus we find *mistura bismuthi*, *mistura colchici*, *mistura copaibæ*, or again *mistura ammoniæ et senegæ*, *mistura ferri et quassiae*, *mistura sodæ c. rheo*. It used to be considered a golden rule that the name of a mixture should have no reference to the supposed action, but in the list this rule has been transgressed repeatedly; thus we meet with *mistura astringens*, *mistura carminativa*, *mistura diuretica*, *mistura expectorans*, and so on. While the various ingredients of these mixtures have obviously been carefully selected with primary reference to the avoidance of deterioration, it is satisfactory to note the wide range of really useful remedies capable of inclusion. The compilers have not felt bound to galenicals mentioned in the British Pharmacopoeia, but have dipped into the Pharmacopoeia of the United States for a liquid extract of colchicum seeds and a liquid extract of senega root. They have also drawn on the British Pharmaceutical Codex for an emulsion of chloroform which appears in 9 of the 28 mixtures, and from the same source, without acknowledgment, they have derived the *liq. cocci*. Apart from the small amount of tincture of *quillaia* (2 per cent.) present in the emulsion of chloroform, and the liquor *cocci* in *mistura tussis*, each fluid ounce containing 1 minim of a solution of 20 per cent. of alcohol, alcohol is noteworthy by its relative absence in these stock mixtures. *Tinctura camphoræ composita* and *tinctura opii* are the only other representatives, and these are certainly not included for any preservative action of the alcohol. In natural contrast to the prescriptions commonly met with, we have to note the absence of sugar, with the exception of that contained in *pulv. cretæ aromat.*, and of syrup, which is represented only in the *mistura tussis*.

It is stated that this list has been "agreed" on by the British Medical Association and the Pharmaceutical Society of Great Britain, or "adjudged" by the Insurance Commissioners, and congratulations are due upon the general excellence of the work. One mixture, however, has already afforded an occasion for mirth. It contains six ingredients, of which three are powdered vegetable drugs; a pharmacist's assistant suggests that this compound is the idea of a doctor who hides his identity, and there is no clue whether the praise or blame is to be awarded to the two bodies who "agreed," or to which one of them, with the Insurance Commissioners who "adjudged." This is a pity, as otherwise some information might be given about the mode of securing suspension of these powders.

### SIMULATED JAUNDICE FROM PICRIC ACID.

IT may be interesting at this time, when subterfuges may in some few instances be resorted to in order to escape the obligations of duty to the State in respect to military service, to draw attention to a new method of detecting picric acid in the blood in cases of simulated jaundice. Dr. L. Tixier and Dr. A. Bernard publish such a method in the *Progrès Médical*, Nov. 20th, 1916, and its advantages lie in the fact that it is simple and requires only a small quantity of blood taken from a finger tip, and a further merit consists in the possibility of the test being applied as late as three weeks after the picric acid has been taken. The

method advocated by these observers is as follows: 15 drops of blood from the finger are received into a test-tube containing 3 c.c saline solution 95 per cent., and well shaken twice or thrice at intervals of an hour in order to facilitate separation and contraction of the clot. The test-tube is then allowed to remain 24 hours at the ordinary temperature. A certain number of globules fall to the bottom, while the rest remain entangled in the clot. From 1 to 2 c.c. of the saline solution in the neighbourhood of the clot are then taken out by a pipette. This fluid is coloured faintly with yellow in cases of picric jaundice; an equal quantity of a 1 in 50,000 solution of methylene-blue is then added and vigorously shaken. After an hour from 10 to 15 drops of chloroform are added and after shaking are allowed to subside to the bottom of the tube. If the picric acid is present in considerable amount the chloroform takes a dark bottle-green tint, in smaller quantities a pale green. The same experiment performed on 24 patients suffering from catarrhal jaundice gave no reaction.

#### THE LAW AND THE DOCTOR.

We have received a copy of an address delivered before the Academy of Medicine, Toronto, by Mr. Justice W. R. Riddell, a judge of the Supreme Court of Ontario, under the above title. The subject would appear to be a large one for treatment in a single discourse, and the lecturer has not unnaturally found himself drawn into the discussion of the more obvious points at which the law and the doctor come into contact, or, not infrequently, into collision. Equally naturally a prominent place is assigned to those doubts and questionings which arise in circumstances likely to lead to such contact or collision. Instances of these occur when a medical man finds himself, in consequence of professional attendance upon a patient, the receptacle of a secret, the revealing of which might expose his patient to prosecution, whereas the concealment of it might subject the medical practitioner to blame, if not to the suggestion of criminality on his part. There are also cases in which the medical man has become acquainted with facts which, if made known in a court of law, might affect the result of a civil action. The lecturer illustrates cases where crime is involved with concrete examples, such as the visit to a doctor of an injured man who states that his hurts are due to his having been interrupted when committing a burglary. Another slightly different example given by him is the familiar one of the medical man who attends a woman who has aborted, and who is told nothing, but suspects that there has been criminal interference which has caused her condition. The Canadian judge propounds in the latter case the question whether the medical man should make no inquiries or should try to find out who performed the illegal operation. He gives the same advice in both instances that the medical man is in no different position from the layman and that he should look at the matter from the point of view of a "good citizen," or in the case of the woman as if he were a "friend" instead of a "doctor." We are, however, disposed to consider such comparisons to be misleading and to point out that the medical man is in a totally different position from any layman. He is consulted in consequence of his practice of a certain profession, and consequently is far more often exposed to the dangers and difficulties which

confidences of the kind indicated must involve; he can have no feelings of friendship towards a patient who is a stranger, but he has the general ethical rules of his profession forbidding him to reveal his patient's secret; he, further, has knowledge of facts in which the law would be interested such as no layman would possess, whether the latter became the confidant of a burglar or formed the opinion that a woman had been the prey of an abortionist. The medical man occupies, in short, an exceptional and altogether peculiar position. The law affords him no special protection or privilege; in this our courts and those of Canada apparently agree. Equally, however, in Canada and here, the medical man is treated usually with consideration as a witness, where the revelation of professional confidences is involved, and if a judge decides that in accordance with the law, and to further justice, he must break silence, none should blame him for obeying the law of his country. He will, however, be well advised if, in attending all patients, he avoids by every means in his power being made the recipient of confidences not necessary to assist him in the treatment of the case before him. It is obvious also that he should allow no one to know that any such confidences have been imparted to him, or even that he may possess knowledge professionally acquired the revelation of which would damage his patient. As a general rule, also, he should remember that his duties are those of a medical man, not a detective. The obligation to maintain secrecy with regard to his patient's affairs may, however, be relaxed in one respect; when he feels it to be desirable for his own guidance he should obtain advice as to what his conduct should be, and no one will blame him if he consults a brother practitioner. To do so will strengthen his own position, if his actions should ever be impugned, by securing for him a witness who will testify to his good faith and to the correctness of his conduct.

#### SYPHILIS WITHOUT CHANCRE IN WOMEN.

THE occasional absence of chancre in certain cases of syphilis, particularly in women, has long been recognised. At a recent meeting of the Académie de Médecine of Paris Professor Gaucher brought forward an interesting view of this phenomenon. Chancre being simply the reaction of the epidermis attacked by the virus, it is obvious that if the inoculation takes place more deeply, by introduction of the virus into the general circulation, the reaction will be absent. Professor Gaucher gave as an example the case of a surgeon who in operating on a syphilitic patient wounded himself deeply with a bistoury. He never had a chancre, but six weeks later the roseola appeared. Another case was related to him by the late Professor Fournier. At the Saint Louis Hospital psoriasis was being treated by intramuscular injections of yellow oxide of mercury. One day a patient suffering from psoriaform syphilis, which was mistaken for psoriasis, was injected. The same needle was used to inject a patient suffering from psoriasis and six weeks later the roseola appeared. In women Professor Gaucher admits that the chancre is frequently overlooked and cannot be found if the examination is not made until the end of two or three months, although in men the chancre does not usually spontaneously heal so quickly. But there are indisputable cases in which a man has contracted a chancre in extra-marital relations, has had intercourse with his wife before he knew he was infected, and, when enlightened as to

the danger, has had her examined as often as four or five times in a month. Although the external genitals, vagina, and cervix have been examined with the greatest care and nothing has been found, yet secondary symptoms have appeared a few weeks later. In such cases Professor Gaucher not only has failed to find a chancre, but even any enlargement of lymphatic glands. His explanation is as follows. Chancre can exist only on the skin or on the mucous membranes covered with stratified epithelium, such as the mouth, prepuce, vagina, and anus, which are all derived from the skin. Rectal chancres may be urged as an objection, but Professor Gaucher thinks that these would be more correctly described as chancres of the upper part of the anus. All these surfaces are not absorbent of liquids, while the mucous membrane covered with columnar epithelium is. Professor Gaucher therefore suggests that in the cases of syphilis in women without chancre the virus is carried into the uterus. If impregnation takes place the woman, of course, is infected through the foetus. But if it does not, she can still be infected—by absorption of the virus through the mucous membrane. These cases of "spermatic infection" show certain characteristics. Like conceptual syphilis, the disease remains latent or progresses slowly without any great outbursts, and manifests itself by late lesions. Thus a woman who had not suffered in any way previously showed gummatous on the legs 30 years after marriage. The husband admitted that he had syphilis 10 years before marriage, but for a long time before marriage he had no ulcer or contagious lesion of any kind. Pregnancy never occurred. Another woman was seen for leucoplakia of the tongue, and a third for disseminated sclerosis with a similar history. —

#### ECONOMY IN GLYCÉRINE AND SUGAR FOR MEDICINAL USE.

OUR readers know well enough the great national call there is on glycerine for the manufacture of munitions of war and also the shortage of sugar owing to reduced importation, and they will appreciate any information as to how these commodities may be spared by the use of substitutes which, in the majority of cases, may be made to serve the same purpose. It is well known, for example, that substances for which glycerine is ordinarily used as a solvent are usually sufficiently soluble for all practical purposes in other media, while chloroform water is an excellent sweetener as well as preservative. As a demulcent glycerine can be replaced by a number of mucilaginous substances available, while as a laxative the resources under this category are so numerous as to put glycerine out of court for the purpose, except, it may be, in very special circumstances. Similarly, as an ingredient of lotions and douches, other solutions, saline and alkaline, are equally effective. As regards sugar as a flavouring agent, it can be spared easily and replaced by chloroform water, aromatics, and other well-known agents which serve to mask disagreeable flavours. In regard to other drugs, in connexion with which it is well that caution should be observed, it may be noted that veronal, carbolic acid, paraldehyde, phenacetin, and phenazone are still in short supply, while atropine, lanoline, the salicylate group, and thymol are now being made in this country in considerable quantities. High prices, however, still prevail, and it is desirable that the use of these drugs, in the interests of economy,

should be confined to urgent cases. Eucaine and novocaine are being manufactured on a substantial scale in this country, and these valuable drugs may be used with some freedom where their application is indicated. —

#### DERCUM'S DISEASE: ADIPOSIS DOLOROSA.

Two cases of this rare condition have recently been published in the Italian medical press, one by Dr. F. Alzona in *Il Policlinico* (Medical Section, Dec. 1st, 1916) and the other by Dr. A. Balliano in *Il Morgagni* (Archives, Nov. 30th, 1916). First described by Dercum in 1888, an American observer who drew attention to the two fundamental characteristics of the disease—increase of fat and painfulness; the symptom-group was amplified later on by Vitant with the addition of the following—muscular asthenia and psychical changes. Similar conditions had previously been described in this country by Baker and Bowlby in 1886. Some authors have stated that the condition is more frequent in women, but statistics are still uncertain, perhaps because patients in many instances do not suffer much from the disease, especially when the pain is bearable and the psychic disturbances do not exceed certain limits; the condition is discovered in most cases when medical advice is being sought for extraneous reasons. While non-painful adiposity is more often hereditary, Dercum's disease is always acquired and usually develops between the ages of 15 and 40 years, an onset before or after these ages being relatively infrequent. Two forms have been distinguished, the nodular and the diffuse; both patients, however, described by the two Italian observers belonged to the former category, both were males 26 and 38 years of age, and presented painful subcutaneous fatty nodules, chiefly on the thorax and thighs, varying in size from a grain of rice to a goose's egg, roughly symmetrical in distribution and painful not only on pressure but spontaneously. Neither case presented any conspicuous muscular debility, nor were any marked psychic changes noticed, albeit both men were rather apathetic and taciturn. Bioscopical examination of some of the tumours in both cases showed, in sections stained with osmic acid, Sudan III., and eosin-hæmatoxylin, apparently normal adipose tissue, surrounded by a thin connective-tissue capsule richly vascular, but, on the other hand, poorly furnished with nerve elements which were, however, free from any appreciable change. Three theories have been advanced to explain the pathology of Dercum's disease; they have had various advocates and may be summarised under three heads: (1) the nerve theory, which attributes the essential factor to a neuritis; (2) the theory of changes in the internal secretions, founded on alterations observed in the pituitary, thyroid, testicular, and ovarian glands; and (3) the theory of a dystrophy of the endocrine-sympathetic system. A sidelight is thrown on these theories by the cases described by Dr. Alzona. The patient had been an hystero-epileptic, presenting extensive sensory disturbances, and the beginning of the disease coincided with a period of his life when he was the subject of violent emotional crises. Moreover, experiments with a view to ascertain his reaction to adrenalin, atropine, and pilocarpine revealed the fact that whereas in the first two the reaction was negligible, in the case of pilocarpine it was very marked, characterised by increased cardiac pulsation, nausea, profuse salivation, and sweating. The theory of

an endocrine-sympathetic dystrophy is one which fits in best with the symptom-group of Dercum's disease. It is difficult to find an adequate explanation of the phenomena in abnormality of the thyroid or pituitary functions alone, and to bring fresh light on to this obscure question further pathological researches are needed with a view to investigate the functional of the nervous system on the one hand, and the endocrinic apparatus on the other.

#### RICHARD LIEBREICH.

Dr. Richard Liebreich, who died in Paris on Jan. 29th in his eighty-eighth year, was oculist to St. Thomas's Hospital, London, before Nettleship, but became a naturalised Frenchman more than 50 years ago. With the possible exception of Zehender, he was the oldest living oculist, his first contribution being in 1857 on the use of the ophthalmoscope, in a translation, published in Brussels, of William MacKenzie's great work on the eye. The longest of his own writings was on amaurosis and amblyopia in a dictionary of practical medicine published by Messrs. J. B. Bailliére et Fils in 1864. Liebreich had some little reputation as a painter and sculptor, and a series of lectures on Turner and Mulready, delivered in the "eighties," was reprinted by Messrs. J. and A. Churchill.

#### THE ROYAL SOCIETY OF MEDICINE AND THE NAVAL AND MILITARY MEDICAL SERVICES.

We have had frequent occasion to note that commissioned officers of the Naval and Military Medical Services are unaware of the cordial invitation extended to them by the Council of the Royal Society of Medicine to make free use, when in London, of the Society's Rooms, and to use the library for purposes of reading and reference. Rooms are set apart for writing, smoking, tea, conference, and dressing. They are further welcome to attend any of the numerous meetings which are held for papers and discussions, as announced from week to week in the medical press. The society's house (1, Wimpole-street, Cavendish-square, W.) is open from 11 A.M. to 6.30 P.M.

AT the Royal College of Surgeons of England next week Surgeon-General Sir George Makins will deliver (Wednesday, Feb. 14th) the Hunterian oration on Hunter's Influence upon Military Surgery; Professor J. Hutchinson will deal with Dupuytren's Contraction in his Hunterian lecture on Monday, Feb. 12th; and Professor W. Sampson Haudley with Paget's Disease of the Nipple on Friday, Feb. 16th. In the following week Professor R. H. Elliot will deliver (Monday, Feb. 19th, and Wednesday, Feb. 21st) two Hunterian lectures on Couching for Cataract in India. The lecture hour in each case is 5 P.M.

#### THE LANCET, VOL. II., 1916: THE INDEX

OWING to the continued shortage in the paper-supply the Index and Title-page to the volume of THE LANCET which was completed with the issue of Dec. 30th, 1916, have been printed separately, and copies have been supplied gratis to those subscribers who have, up to Feb. 8th, intimated to us their wish to receive them. Other subscribers will be similarly supplied, so long as the stock remains unexhausted, on application to the Manager, THE LANCET Office, 423, Strand, London, W.C. Such applications should be sent in at once.

**THE FOOD OF THE NATION.**

BY EDMUND I. SPRIGGS, M.D. LOND., F.R.C.P. LOND.,  
SENIOR PHYSICIAN, DUFF HOUSE, BANFF; LATE SENIOR ASSISTANT  
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THE MEDICAL SCHOOL.

THE manifesto of the Food Controller which was published on Feb. 1st was received by the press and people with much interest and enthusiasm. Lord Devonport asked the nation to confine itself to a measured quantity per head of three important foodstuffs, leaving it to the discretion of each housewife to make up the diet of the family with other materials. On the same day a White Paper was published, containing a Report on the Food-Supply of the United Kingdom drawn up by a committee of the Royal Society at the request of Mr. Rucliman, late President of the Board of Trade. The committee included the professors of physiology in the Universities of London, Glasgow, and Dublin, and the professor of bio-chemistry in the University of Cambridge. The first and second parts of the report are dated July, 1916; the third part bears date December, 1916.

The report is of great interest. It contains the statistics upon which we presume that the Ministry of Food based its deliberations, though no doubt more recent figures are now in their possession. The matter is of such importance, and especially to medical men, whose advice is being sought all over the country in the matter of diet, that it may be well to review the main features of the report before considering the manifesto.

Those who have read the small book on the food-supply of Germany<sup>1</sup> compiled by a committee of German professors, an abstract of which appeared in THE LANCET of Feb. 20th, 1915, or its translation by Dr. Russell Wells,<sup>2</sup> will recognise some familiar features in the White Paper, as is indeed to be expected. The differences are perhaps more interesting than the similarities, for the problem in Great Britain is not the same as the problem in Germany, either as regards the quantity or the nature of the foods concerned.

The report begins with an examination of the amount of food materials available for consumption by the population of the United Kingdom in the five years preceding the war, based upon figures supplied by the Board of Trade. The table shows the proportion of each food which was home-grown and the proportion which was imported. The total supply of food yielded an annual average of 51 millions of calories, which gives 3091 calories per head per day.

Children are, of course, included in the counting of heads, and in order to avoid confusion on this account the committee, as is done in the Elitzbacher report, has calculated the population in terms of "men" on a scale which ascribes values to children according to their age, and regards a woman as eating four-fifths as much food as a man. In receding diet on this scale 100 men, women, and children, on the basis of their proportions in this country in the year 1911, are equal to 77 adult units or "men."

The food-supply per "man" is, therefore, greater than the food-supply per head. It works out, in the years 1909-13, at just over 4000 calories per "man" per day, made up of 113 grammes of protein, 571 grammes of carbohydrate, and 130 grammes of fat. An independent estimate by Professor W. H. Thompson (Appendix I. B.) gives substantially similar figures—namely, 3361 calories per "man" per day, with 111 grammes of protein, 549 grammes of carbohydrate, and 125 grammes of fat.

The committee set forth that the "dietary requirements of a nation for the most part engaged in active work ..... cannot be satisfactorily met on a less supply in the food as purchased than 100 grammes protein, 100 grammes fat, 500 grammes carbohydrate, equal approximately to 3400 calories per 'man' per day, a 'man' being an average workman doing an average day's work."

It appears, therefore, that the supply of food has not only met the national needs in the past, but has exceeded them, the margin of excess or waste being at least 10 per cent, in the case of protein and carbohydrate and as much as 25 per cent. in the case of fat.

<sup>1</sup> The Food-supply of the United Kingdom. Published by H.M. Stationery Office, 1917.  
<sup>2</sup> "Die deutsche Vorkriegsernährung und der englische Ausungerungsplan," 1915, edited by Professor Paul Kitzbacher.  
<sup>3</sup> English translation by S. Russell Wells, M.D., "Germany's Food, Can it Last?" University of London Press, 1915.

Before leaving this, the first part of the report, it is of interest and, indeed, of importance at the present time to take note of what share each kind of foodstuff contributes to the total caloric value of the food. The following figures in column 1 are taken from Table I. of the report, but their order is altered, those foods being put first which yield most energy. I add a column (2) showing what percentage of the total caloric yield is furnished by each.

*Table Showing the Annual Yield of Calories of the Chief Classes of Foodstuffs in the Years 1909-13, with the Percentage of Total Energy Furnished by Each Class.*

	Energy value. Millions of calories.	Percentage of total supply.
Cereals	17,712,000	34·7
Meat	8,890,000	17·4
Dairy produce (including lard and margarine)	8,253,000	16·2
Sugar (including cocoa and chocolate)	6,633,000	13·0
Vegetables	4,812,000	9·4
Cottage and farm produce not included above	2,655,000	5·2
Fruit	1,077,000	2·1
Fish	531,000	1·0
Poultry and eggs, game and rabbits	461,000	0·9
Total	51,024,000	99·9

The chief cereal foodstuff is, of course, wheat. It can be seen from the details in Appendix I. A that if other cereals are left out of account, 30·8 per cent. of the total energy is furnished by wheat alone.

A consideration of the table shows that in the five years preceding the war 61·2 per cent. of the total food value of the nation was provided by three foods alone—namely, wheat (30·8 per cent.), meat (17·4 per cent.), and sugar (13 per cent.). A further 25 per cent. was furnished by dairy produce and vegetables, whilst other foodstuffs, including fruit, fish, poultry, eggs, game, rabbits, and all cereals except wheat, furnished only 13·4 per cent. of the total food energy.

Part II. deals with the food supply during the war. After considering information furnished to them by the Board of Trade and the Board of Agriculture, and comparing the supply with the estimated population in 1916, the committee reported that the main foodstuffs, meat, wheat, fish and sugar, showed a small increase during the year ending June, 1916, as compared with pre-war conditions, and that they had no evidence that the supplies of other foods were diminished.

They point out, however, that "the needs of our armies, the decreased yield of the harvest at home in 1916, and possible interference with our supplies from abroad, may reduce the supply in future below this level." They lay also proper stress on the fact that "in buying food the labouring population is buying energy," and that "a slight reduction of food below the necessary amount causes a large diminution in the working efficiency of the individual."

An appendix dealing with Army rations shows that the troops are receiving a value of 4334 calories, which at the front, with extras, may be increased to 4644 calories, including 164 grammes of protein and 205 grammes of fat. This is, as it should be, a suitable and liberal allowance for those doing hard muscular work and exposed to cold.

In Part III. the committee discuss possible methods of economising the available food-supply. Their recommendations as to the milling of flour and the use of food materials in brewing have already in whole or in part been carried into effect. In a short appendix upon alcohol they point out that whilst alcohol in moderate doses is burnt in the body, it has "effects as a drug which cannot be ignored in appraising its value as a food," and that "repeated experience has shown that regiments not supplied with alcohol marched farther, and were in better condition at the end of the day, than others to which it had been given."

Further points of importance are suggested. A more economical production may be obtained by killing beef when it is younger; the best use of fodder, however, is not obtained by feeding bullocks, for three times the number of calories may be obtained per unit of fodder by feeding good cows for their milk or feeding pigs. A considerable gain of protein would also result if milk were used for making cheese rather than for making butter.

Turning now to the manifesto of Feb. 3rd, it is first to be noted that the quantities of the main foodstuffs recommended—namely, 3 lb. of flour, 2½ lb. of meat, and ½ lb. of sugar—are for each head of the population per week, including children. In order to calculate how far they meet the needs of the body, we may convert the figures into quantities per "man." In the report of the Committee of the Royal Society the population in 1916 is estimated as 46·5 million, equivalent, at a man-value of 0·77, to 35·8 million adults or "men." If 4,000,000 men are subtracted as being fed from army rations the number of civilian "men" to be fed is 31·8 million, and the number of civilian heads is 42·5 million. The ratio between population and man value is therefore 42·5 : 31·8, and the allowance per "man" of the civilian population will be 4 lb. of flour, 3·34 lb. of meat, and 1 lb. of sugar. These are the full quantities for an adult man; a woman should have four-fifths of them and children somewhat smaller proportions according to their age. The share of a child between 6 and 9 years old would be half the adult quantities. Children over 13 need as much, on the average, as a woman.

The corrected allowance gives the following values per "man" per day:

Food per week.	Food per day.					
	lb.	oz.	Grammes	Calories.	Protein.	Carbo-hydrate.
Flour, 4 ...	9·1	258	939	29	194	3
Meat, 3½ ...	7·6	216	540	41	—	40
Sugar, 1 ...	2·3	65	267	—	65	—
Total ...	...	...	1746	70	259	43

The figures used for the composition of flour are those in Appendix I. B. of the Committee's report. I have taken meat as containing protein 18·9 per cent., fat 18·5 per cent., giving 250 calories per 100 grammes. This is a fairly average figure for meat, whether beef, mutton, or lamb.

The dietary requirements of an adult are taken in the report, as mentioned above, to be 3400 calories with 100 grammes of protein per "man." We see, therefore, that the flour, meat, and sugar allowed by the manifesto supplies a little over one-half of the food which an average man doing work needs.

The ration contains a good proportion of protein; indeed, we need not consider protein further, for in an ordinary mixed diet, if the calories are sufficient, there is generally enough of it. Only when there is grave shortage of bread, meat, and milk, does the protein in a ration run low. The same may be said of fat. I have shown above that over 77 per cent. of the total food in the country in 1916 consisted of wheat, meat, dairy products, and sugar. These are the available foods, and their composition is such that if enough calories are supplied the proportion of protein and fat will be adequate, assuming a fairly equal distribution of food-stuffs.

If the diet is to be made up to the standard there remain to be supplied from other foods 1654 calories.

The common available foods from which the balance of the diet must be made up are: oatmeal, barley-meal, tapioca, sago, arrowroot, rice, eggs, fish, milk, butter, margarine, lard, cheese, potatoes, peas, beans, and lentils.

We can estimate roughly what quantities of other foods have been available up to the present by comparing the average annual amounts given in the report with the returns which the Government has just published<sup>4</sup> of the imports for 1916. If we assume, in the absence of other information, that the country is producing about the same quantity of food, or at all events not less than the average, the chief variation will be in imports.

By adding on the imports in 1916 to the average produced in former years an estimate has been made in the case of every one of the above foods. A proportion of these foods will be required, of course, for the Army, and in order to be on the safe side I have counted the army as containing 5,000,000 men. After subtracting their share the figures given in the table below were obtained.

The comparatively small quantity of maize is left out of calculation, as are fruits. Fruits furnished 2 per cent. of our

\* Accounts relating to trade and navigation. H.M. Stationery Office, December, 1916.

supply of energy before the war, but the imported total exceeded greatly the total amount produced at home and we may suppose that they will be available in smaller quantities. Other vegetables than potatoes, beans, peas, and lentils are omitted as, though valuable in a diet, their food content is low.

These figures are not accurate. They are an estimate from such sources of information as are open to the public. But unless there has been a large increase in the production of these accessory foodstuffs it is improbable that their total value exceeds that given.

	Estimated amount available for civilians—metric tons.	32,000,000 ÷ 365 = grammes per day per man.	Calories	Protein	Carbohydrate	Fat.
Oatmeal ... ...	168,500	14·4	59	2·3	9·7	1·0
Barley-meal ...	21,600	1·8	6	0·2	1·3	—
Rice ... ...	380,500	32·6	117	2·6	25·8	0·1
Fish ... ...	735,600	63·0	37	6·3	—	1·3
Eggs ... ...	173,100	14·8	20	1·8	—	1·4
Milk ... ...	3,892,000	333·0	237	11·0	16·6	13·3
{ Butter ... ...	194,300	16·6	132	0·2	—	14·1
{ Margarine ...	173,200	14·8	115	0·2	—	12·3
Lard ... ...	91,300	7·8	69	0·2	—	7·3
Cheese ... ...	140,200	12·0	47	3·0	0·3	3·6
Potatoes ... ...	3,449,000	295·0	202	5·3	43	0·3
Peas, beans, and lentils ... ...	18,400	1·6	6	0·4	1	—
			1047	33	98	55

We see, then, that the foods available in 1916, other than meat, flour, and sugar, after subtracting a due share of them for the Army, leave per "man" a value of 1047 calories, with 33 grammes of protein.

The meat, flour, and sugar allowed gives 1746 calories and 70 grammes of protein. Adding the two together—that is, the "allowance" foods and estimated quantity of other chief foodstuffs available per man—we get a total of 2793 calories, 103 grammes protein, 357 g. carbohydrate, and 98 g. fat. There remain to be added tapioca, sago, arrow-root, fruit—all of some value, but not enough to alter the total materially.

The calculation allows no margin for loss in distribution or for waste.

It would, of course, be easy in ordinary circumstances to add other foods to the fixed quantities of meat, flour, and sugar so as to make up a diet of 3400 calories or more, and to ensure that it shall contain plenty of each needful food-stuff. But the problem before us is not the dieting of a few individuals or even of a large group; it is the feeding of the nation. It appears likely that if all the accessory food-stuffs could, apart from other considerations, such as cost, be divided equally among us, there would not be enough to make up the daily ration to 3400 calories per "man."

It is true that a large number of people eat much less than 3400 calories. For the majority of adults with sedentary occupations the allowance, plus such a share of the remaining foods as my estimate gives, is enough or more than enough. But there are others who need more than 3400 calories, and these others include the great mass of workers whose continued and efficient activity is essential at the present time. The food requirements of workers have been long established. A modern illustration of what ordinary workers consume will be found in the interesting Memorandum by Dr. Leonard Hill issued by the Ministry of Munitions.<sup>5</sup> A single meal frequently exceeds 1000 calories and may reach 1500, in net figures of the value of the meal as served, not as bought. Considerably more must be allowed for in buying the food. Further, men doing continuous severe labour may require well over 4000 calories. If the workers do not get enough food they cannot do the same work. A man may by grit or pluck work hard for a little while on a low ration, but he is living on himself and very soon his work will fail.

Meat and sugar are valuable foodstuffs, but their restriction does not matter so much as that of flour. More flour is needed, and every effort should be made, as no doubt it will

be made, to ensure the supply at the expense of any other commodity, for none other is so vital.

Probably the most valuable food to import, after wheat, is fat, such as margarine, on account of its high caloric yield per unit of weight. So long as our stock of cattle and sheep is not depleted,<sup>6</sup> sugar comes next from a dietetic point of view. In addition to being a useful food, with no waste, it has the great advantage of rendering other foods palatable. Cheese, again, until we make enough of it at home, is good food to import; it has a high energy value and there is but little waste in its use.

We hope for a more abundant and economical food production, such as we are told might be effected by adjusting crops, producing more milk, making more cheese, and the like; but changes in the conditions of agriculture and of labour take time.

It cannot be said that our people have suffered from any shortage of food so far. They will welcome the energy and earnestness with which the matter is being approached, and will await with much interest such measures as may be necessary to continue to ensure a sufficient and equal distribution of food.

## THE CONTROL OF VENEREAL DISEASES.

### *The Immediate Need of Compulsory Notification of Venereal Diseases for the Defence of the Realm.*

UNDER this heading a correspondent who signs himself "M.O." and who has undoubtedly given much time and thought to the question, writes to us as follows:—

I have recently had under my notice a case in which one woman, the wife of a soldier serving abroad, infected with syphilis three soldiers of the same battalion in the course of ten days. The police were communicated with, but are powerless in the matter unless the woman can be caught "soliciting," which, under the circumstances, is extremely unlikely—and there appears to be no remedy. At the present time compulsory notification is in force for men in the Army and Navy. All men suffering from venereal diseases are notified, sent to hospital, and kept there until cured. Surely there would be no injustice in extending the principle of notification and detention to women and to the rest of the population. But this notification should be limited to actively infective persons. No good would be done to compensate for the trouble involved in making syphilis in all stages compulsorily notifiable, but all women and men known to be a source of danger to the community and the State ought to be notified and sent to hospital until cured. This could be effected immediately under the Defence of the Realm Act.

We fully share our correspondent's desire to see immediate steps taken for the efficient treatment of all persons suffering from actively infective venereal diseases. The Royal Commission on Venereal Diseases also expressed this desire, and it is the working policy of the National Council for Combating Venereal Diseases which is helping to carry out the recommendations of the Commission. Our correspondent thinks that notification immediately put in force would help this policy. The Commission and Council thought otherwise, and have given reasoned arguments for their belief, which is shared by a large proportion of the active workers for venereal control. Put briefly, they hold that until skilled treatment is freely placed at the disposal of the venereal patient, and until he has been educated to believe in its value, compulsion will only drive him to concealment and the tender offices of the quack. But the quack will shortly be reduced to impotence, while the value of preventive measures is rapidly becoming better known.

### *The Remuneration of Female Medical Officers for Treatment Centres.*

At a meeting of representative medical women's societies held on Jan. 27th attention was drawn to the following facts: (1) That at least one advertisement, appearing in both the lay and medical press, for a female medical officer under a local scheme for the treatment of venereal diseases, offered a salary considerably lower than that offered to the male medical officer; and (2) that apparently the female medical officer was not to have charge of the female beds.

<sup>5</sup> Investigation of Workers' Food and Suggestions as to Dietary. L. E. Hill, M.B., F.R.S. H.M. Stationery Office. 1916.

<sup>6</sup> Agricultural Statistics, 1916, II., Part I., H.M. Stationery Office, 1917.

The following resolution was passed :—

That this meeting feels it to be a matter of urgent importance that, under any local venereal scheme, a medical woman should be appointed at an adequate salary, to have charge of the women's clinic and the women's venereal beds.

We have not seen the advertisement to which allusion is made, but we recall a passage in the city of Liverpool scheme in which it was proposed to offer a female non-resident clinical assistant a salary of £100, compared with £250 for the male assistant, "on the ground that the man's work will be more than double that of the woman's." Equal pay for equal service is a principle to which we believe the medical profession would generally assent.

#### *Treatment of Venereal Diseases in Honolulu.*

In the *Military Surgeon* for December last Captain L. C. Mudd, a member of the Medical Corps, U.S. Army, relates his methods for treating venereal disease in Honolulu. Gonorrhœa cases are kept in bed from the first, are given a four-hourly injection of 1 per cent. protargol into the anterior urethra, low diet, and a vaccine of gonococci—25 millions on the first day, the dose being repeated every other day and each time increased by 25 millions till 200 millions are reached. These injections are, the writer believes, useful in preventing or aborting the complications. In cases of syphilis he aims to attack the treponema as quickly as possible, and gives an injection of sa'varsan directly the diagnosis is clear (0·6 gm. suitably dissolved in 15 c.c. distilled water intravenously). Patients are not laid up, and no awkwardness has occurred. The injection is repeated weekly for three weeks more, and then 1 grain of salicylate of mercury is injected hypodermically over the ilium weekly for four weeks, when three weeks' rest is given. Subsequent treatment is regulated by the Wassermann reaction. This scheme of treatment has often prevented secondary eruptions, and during eight months no primary case so treated has been followed by roseola. A soldier who recently, in the first stage, refused treatment, was sent by court-martial to hard labour for six months. There has since been no trouble in securing the routine attendance of patients at the proper time.

#### *The London Hospital Medical College.*

Demonstrations on the methods of administering sa'varsan substitutes will be given in St. Anthony's ward of the hospital on Tuesdays at 1 o'clock.

#### *Enlightenment Campaign.*

In his public lecture on Social Prevention at the Picton Hall, Liverpool, on Jan. 26th, Professor J. M. Beattie said that Liverpool had not awaited the report of the Royal Commission to take action, but had for some time past through its health committee undertaken the investigation of venereal diseases in children. He expressed the opinion that the Commission's recommendations would not be crowned with full success until venereal diseases were made compulsorily notifiable.—Lord Sydenham, presiding on Jan. 31st at a lecture delivered before the Royal Institute of Public Health by Dr. O. J. Macalister on the Prevention and Arrest of Venereal Disease in Man, expressed the hope that legislation dealing with quacks and quack advertisements would soon be forthcoming, and also for the protection of the medical man from action for libel in connexion with information given in the public interest. Dr. Macalister said that he regarded education as the first weapon for use in the service of prevention and as a necessary preliminary to notification.

## THE SERVICES.

### ROYAL NAVAL MEDICAL SERVICE.

Fleet-Surg. E. B. Townsend is placed on the Retired List, with rank of Deputy Surgeon-General.

To be temporary Surgeons : H. M. Atkinson, A. A. Cockayne, D. G. Churcher, M. Pearson, W. V. Gabe, J. G. Stevens, C. J. L. Blair.

### ROYAL ARMY MEDICAL CORPS.

Capt. (temp. Major) J. Bruce to be temporary Lieutenant-Colonel whilst commanding a Field Ambulance.

Capt. R. A. Preston, Spec. Res., to be Lieutenant and to be granted the temporary rank of Captain.

Temp. Lieuts. John H. Thornley and R. O. Whyte to be temporary Captains.

Capt. W. L. Apilin Harrison, R.A.M.C., Spec. Res., to be Lieutenant, and is granted the rank of temporary Captain.

Temporary Captains relinquishing their commissions: A. G. Henderson, R. Sinclair, and G. Melville, T. S. Brodie, and R. M. Boyd (on account of ill-health).

Temp. Lieuts. Edward A. Seale and G. Kennedy relinquish their commissions.

### SPECIAL RESERVE OF OFFICERS.

Officers relinquishing their commissions: Capt. R. Hay, on appointment to Indian Medical Service, Capt. J. F. van der Westhuizen, Lieut. (on probation) C. R. Sandford (on account of ill-health).

To be Captains: Lieuts. J. Alston, J. J. B. Edmond, A. McM. Paterson, R. D. Cameron, W. J. F. Craig, W. L. Ingham, C. Rudd, M. Foster, J. Bennet, A. K. Gibson, B. J. Ryrie, J. M. Smellie, D. G. Stoute, J. A. C. Guy, C. W. Dudley, J. A. Nicholson, H. G. Broadbridge, W. Corner, R. R. Powell.

To be Lieutenants: N. S. Tirard, T. B. Micklem, R. A. Woodhouse, E. R. W. Gilmore (from University of London Contingent O.T.C.).

### TERRITORIAL FORCE.

Major A. H. Burgess is seconded whilst holding a temporary commission in the R.A.M.C.

To be Captain: Lieut. W. Rutherford.

Capt. L. D. B. Cogan to be acting Lieutenant-Colonel whilst commanding a field ambulance.

Capt. A. Cuffe resigns his commission on account of ill-health.

### DEATHS IN THE SERVICES.

Colonel Thomas Holbein Headley, C.I.E., I.M.S., on Feb. 2nd, at his residence, St. John's Wood, in his 70th year. He entered the Service in 1869, and was for 24 years Residency Surgeon at Jaipur, and for a few years Administrative Medical Officer for Rajputana. In 1897 he became Inspector-General of Civil Hospitals in the United Provinces, and subsequently, until his retirement in 1903, was the Permanent Inspector in Bengal.

### JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

In the January issue of this journal there appears the first instalment of the report of an Inquiry by Lieutenant-Colonel C. W. Wenyon and Captain F. W. O'Connor into some problems affecting the spread and incidence of intestinal protozoal infections of British troops and natives in Egypt, with special reference to the carrier question, diagnosis and treatment of amoebic dysentery, and an account of three new human intestinal protozoa. There is also a report by Captain Martin Flack on Cerebro-spinal Fever in the London District from December, 1915, to July, 1916, in which the author lays stress on the value of wide-wabbing on the appearance of the disease and the early elimination of carriers of the active organism. Captain R. V. Dolbey gives his experiences in the treatment of gunshot wounds involving the knee-joint, and Lieutenant-Colonel Alfred J. Hull his experiences in gunshot wounds of the spine, while Temporary Lieutenant E. D. Adrian contributes the beginning of a paper discussing the electrical reactions of muscles before and after nerve injury.

## URBAN VITAL STATISTICS.

(Week ended Feb. 3rd, 1917.)

*English and Welsh Towns.*—In the 96 English and Welsh towns, with an aggregate population estimated at nearly 18,000,000 persons, the annual rate of mortality was equal to 18·7, against 16·2 and 17·0 per 1000 in the two preceding weeks. In London, with a population of more than 4,000,000 persons, the death-rate was 19·8, or 1·4 per 1000 in excess of that recorded in the previous week; in the remaining towns the rate ranged from 11·4 in Hornsey, 11·7 in Dewsbury, and 11·9 in South Shields, to 29·1 in Bootle, 31·0 in Exeter, and 31·2 in Bath. The principal epidemic disease caused 265 deaths, which corresponded to an annual rate of 0·8 per 1000, and included 83 from infantile diarrhoea, 82 from measles, 62 from diphtheria, 23 from whooping-cough, 12 from scarlet fever, and 3 from enteric fever. With the exception of enteric fever, the deaths from each of these diseases were in excess of the average in the three preceding weeks; measles caused a death-rate of 1·1 in Plymouth and West Ham, 1·5 in East Ham, and 4·6 in Wimbledon. The 818 cases of scarlet fever and the 1430 cases of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 7 and 40 in excess of the numbers at the end of the preceding week. Of the 6198 deaths from all causes in the 96 towns, 225 resulted from violence. The causes of 72 of the total deaths were uncertified, of which 16 were registered in Birmingham, 10 in Liverpool, 6 in Manchester, and 5 in London.

*Scotch Towns.*—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death rate was equal to 17·7, against rates declining from 18·6 to 16·9 per 1000 in the six preceding weeks. The 364 deaths registered in Glasgow corresponded to an annual rate of 17·0, against 18·8 per 1000 in London, and included 10 from whooping-cough, 4 from measles, 3 each from diphtheria and infantile diarrhoea, and 1 from scarlet fever. The 103 deaths in Edinburgh were equal to an annual rate of 16·2 per 1000, and included 2 each from whooping-cough and diphtheria and 1 from infantile diarrhoea.

*Irish Towns.*—The 201 deaths registered in Dublin were equal to a rate of 26·3, or 3·6 per 1000 higher than that recorded in the previous week, and included 4 from measles, 2 from infantile diarrhoea, and 1 each from whooping cough and diphtheria. In Belfast the 196 deaths corresponded to an annual rate of 25·9, and included 3 from infantile diarrhoea and 2 each from measles and whooping-cough.

*BRISTOL EYE HOSPITAL.*—At the recent annual meeting of the Bristol Eye Hospital, the Lord Mayor (Dr Barclay Baron) presiding, the medical report was presented showing 456 in-patients and 9269 out-patients treated during 1916. There was an adverse balance of £487 on the year's financial statement. The committee recorded their gratitude for the readiness with which the honorary staff had carried on without a house surgeon.

## Correspondence.

*"Audi alteram partem."*

### SPIROCHÆTOSIS ICTERO-HÆMORRHAGICA.

*To the Editor of THE LANCET.*

SIR.—In a letter in your issue of Feb. 3rd Dr. A. F. Hurst suggests that the name spirochætal jaundice should be given to the disease hitherto called Weil's disease, including the various forms of epidemic jaundice which have occurred in the French war area and elsewhere. The name has been recently under the consideration of the subcommittee of the Royal College of Physicians of London engaged upon the Nomenclature of Diseases, now overdue.

May I point out that the name proposed by Dr. Hurst and by Sir Bertrand Dawson<sup>1</sup> is not distinctive. The jaundice of relapsing fever is a spirochætal jaundice, and the rare jaundice of secondary syphilis is obviously spirochætal also. In course of time it is quite conceivable that we may find other spirochætes troubling the liver or the blood in the same way.

What is the objection to the name spirochætosis icterohæmorrhagica? It is rather long, and that is all. It was used by the Japanese discoverers of the organisms, and hence it has a certain title to respect. It has been used by Captain A. Stokes and Captain J. A. Ryle in September in the *British Medical Journal* and in January in *THE LANCET*. The name spirochætosis is on the lines of the names of other diseases based on the organism, and is no longer nor more ugly than some others—e.g., trypanosomiasis, bilharziasis, leishmaniasis, aspergillosis. The name is adopted as an alternative to relapsing fever in one of the "Military Books published by Authority"—namely, "Memoranda on Some Medical Diseases in the Mediterranean War Area" (p. 104).

But, of course, syphilis is a spirochætosis; it might be called *S. luetica*. Relapsing fever wants a qualifying word when it is called spirochætosis; it might be *Oermeieri*. If there are national or patriotic objections, *recurrens* might be tried, unless it is objected that the much-discussed jaundice is also recurrent. *Frambezia* is a spirochætosis; it might be called *S. tropica*, only that *frambezia* is sufficiently distinctive.

Can any shorter qualifying word than icterohæmorrhagica be found? It might be *S. japonica* in reference to its discoverers, or *S. gallica*, if it be granted that the disease was first described by French authors. But, on the one hand, the French writers certainly did not find the spirochæte, and, on the other hand, the name would recall associations of the other spirochætosis which would not be desirable. As the paper recording the discovery of the spirochæte in March last is written by five Japanese authors, the qualification by means of the discoverers' names would be even more cumbersome than that which we have in spirochætosis icterohæmorrhagica.—I am, Sir, yours faithfully,

FRDERICK TAYLOR,  
Chairman of the Committee.

London, W., Feb. 5th, 1917.

### THE PHENOMENA OF ANAPHYLAXIS.

*To the Editor of THE LANCET.*

SIR.—In reply to several letters which have been addressed to you in connexion with my paper in your issue of Jan. 20th, may I point out that it should be read in the light of the first paragraph, where my object in writing it is distinctly defined. At the present time many practitioners are called upon to administer antitoxic sera, while they have no time to study the question of anaphylaxis nor, in many cases, the inclination to expend the energy necessary in wading through the voluminous literature of it. Their ideas, therefore, are necessarily somewhat hazy, and it appeared worth while to attempt to outline the subject as concisely and clearly as possible, and so to afford a basis on which they could work. I have in consequence been forced to confine myself to the general rule, neglecting to a great extent the exceptions thereto. That such exceptions are met with I think is clearly

<sup>1</sup> Quarterly Journal of Medicine, vol. x., Nos. 37 and 38, October-January, p. 50.

indicated in the paper itself, and in sending it to you I anticipated, apparently mistakenly, that the impossibility of living, within rigidly fixed limits, the quantities of antigen necessary in all circumstances to produce all or any of the phenomena of anaphylaxis was sufficiently emphasised. I am convinced, however, that my description represents the facts as accurately as is at present known, and indicates the way in which almost to eliminate the danger of anaphylaxis.

The object of the paper also rendered undesirable the inclusion of many of those details for which Dr. A. S. Leyton asks in his letter in your issue of Feb. 3rd. During the last three months I have seen over 200 serum-treated cases in this hospital alone with three slight cases of anaphylaxis. All these latter had previously received a total of 10 c.c. or more of serum, and in all a period of more than 14 days had elapsed between the ultimate and penultimate injections. Moreover, a series of injections at comparatively long intervals (7 to 10 days) has never caused hypersusceptibility; those cases that reacted had all received a series with short intervals (1 to 2 days). In no case in my series has sensitisation been effected by 3 c.c. or any amount remotely approaching it, although 3 c.c. has been a sufficient toxigenic dose. All of these cases I have carefully observed, and I hope at the termination of my present work to place the details of them on record.

For the figures given in my paper I make, and made, no claim to absolute accuracy, for that is not yet possible; the statement, however, that 4 to 5 c.c. of serum are required to form a toxigenic dose for a guinea-pig is in agreement with the finding of most workers, and the appearance of anaphylactic shock after 4 to 5 minims is certainly not common. Further, as regards the giving of antigen by the mouth, the statement that such ever produces anaphylaxis is explained by the first paragraph of this letter. The possibility of its very rarely doing so is a natural deduction from the previous statement that in certain conditions where the permeability of the walls of the alimentary canal is diminished unchanged antigen may be absorbed, and is, moreover, expressly noted in the footnote referring to the passage in question.

While, however, on the one hand I am so definite as to be obviously wrong, Dr. Frederic Thomson, on the other hand, in his letter in your issue of Jan. 27th (for which I thank him) finds me so indefinite as to be difficult to follow. From what has already been said it is evident that the question of the sensitisation of man is still involved in the greatest obscurity, and my want of precision in the definition of dosage is almost impossible to avoid in existing circumstances. I shall nevertheless venture to indicate by figures what roughly is implied by some of the terms used in my paper. Observation of experiments shows that if a number of animals be taken and each given a single injection of antigen, the second receiving more than the first, the third more than the second, and so on, no hard-and-fast line can be drawn between the effects produced by any two of the series; the intensity of such effects appears to form a curve rising from zero to a maximum, whence it falls again, probably never to zero, but always approaching that point. One is thus reduced to the necessity of a more or less arbitrary division into "small," "considerable," and "massive" doses. As stated in the article referred to, I consider anything below about 5 c.c. a small dose and as effecting no sensitisation, but what dose can be called considerable—i.e., sufficient to sensitise—cannot be so definitely stated and certainly varies in different individuals. I believe that from 15 to 30 c.c. fairly represents it. Anything over 50 c.c. will constitute a massive dose. Small doses, therefore, will have been received by those persons who have suffered one or two prophylactic injections (I speak here, of course, only from the point of view of tetanus); considerable doses by those having three to six, or perhaps ten; and massive by those who have had a larger number of prophylactic or one or more therapeutic doses. Where a number of injections has been given the size of any particular member of the series is of little consequence, the total quantity is the essential factor provided that each injection be made within 10 to 14 days of the preceding; and, of course, the amount of antibodies contained in the serum has no influence whatever on the production of anaphylaxis.

Referring to my statement that any person who has received one or more injections more than 14 days previously must be considered anaphylactic, the contradiction between

it and the above is apparent rather than real. I have never found one or two small doses sensitise a man, but that such a result *never* follows is more than I am prepared to affirm. Therefore, to be on the safe side it is recommended that such person be assumed to be hypersensitive.

I am afraid that I cannot give complete assent to Dr. Thomson's remarks concerning the rashes seen in serum disease, for my experience differs from his. I am at the time of writing completely separated from all my notes, so can give no figures as to the frequency with which I have observed the various eruptions, but a circinate rash has never come under my observation; the great majority have been urticarial with an extremely rare erythematous or morbilliform appearance.

Dr. M. B. Arnold's letter in your same issue is of great interest, and apparently the possibility of a laryngeal oedema should be borne in mind in human anaphylaxis. The details of the condition can, however, be worked out only by observation of anaphylaxis in man, for skin eruptions are not exhibited by laboratory animals. In any case it must be rare, for, so far as I am aware, no other such case has ever been recorded, and as a rule the symptoms point very definitely to an obstruction in the bronchioles and in no way suggest any lesion in the upper respiratory tract. I am of opinion that tracheotomy is not justifiable except in extremis.

With Dr. W. W. O. Topley I am in entire agreement when he says in his letter in your issue of Feb. 3rd that many cases occur which appear hard to reconcile with many of our present ideas concerning the mechanism of anaphylaxis, although I cannot see that his Case 1 offers any such difficulty. Such an experiment is essentially the same as that which forms the basis of Friedberger's theory of anaphylaxis—viz., that it is due to anaphylatoxin produced by the action of a specific antibody upon its antigen and the injection of anaphylatoxin engenders anaphylaxis without any preliminary sensitisation.

I further agree with Dr. Topley that there is evidence pointing to the fact that there is a cumulative element in the condition and have pointed out such possibility in answer to Dr. Thomson above (which was written several days before receipt of Dr. Topley's letter). But there would appear to be a difference between the condition brought about by a series of doses at short intervals and that of a sensitive person who has received a single subminimal injection; at any rate, such a difference is possible, for while the former may be due to a cumulative effect the latter cannot be so explained. As a matter of fact, it is known that in the immunisation of an animal the antigen may in some cases still be demonstrable unchanged in the blood some time after the last injection, but the amount gradually decreases and finally disappears. Thus in the case supposed of a single subminimal dose administered to a sensitive person no antigen is present in the body, and on receipt of the subminimal dose there is not sufficient anaphylatoxin liberated to produce symptoms, but a certain amount of antibody is fixed (negative phase) and complement as well; the animal is thus desensitised. In the case, however, of a continuous series of injections the quick succession of them more than possibly causes the persistence of antigen in the blood, until finally so much remains that on injection of even a small additional amount anaphylatoxin is produced in such quantity as to become manifest by symptoms. All such ideas are, of course, highly theoretical, but serve to show that the two conditions may be, and in my opinion probably are, quite different. A wholly satisfactory theory is as yet far from being demonstrated, and it appears likely that it will remain so until the principles of physical chemistry have been much further elucidated and have found a wider application to biological problems.

I am, Sir, yours faithfully,

Port Pitt, Chatham, Feb. 3rd, 1917. S. WYARD.

#### PNEUMATIC TOURNIQUETS.

To the Editor of THE LANCET.

SIR.—I was pleased to read in your issue of Jan. 27th the appeal of my friend, Professor K. H. Digby, for the more general use of pneumatic tourniquets. From a surgical point of view such a tourniquet must be admirable. My own use of the sphygmomanometer as a tourniquet is for venepuncture for any purpose. In neurological work it is useful

most commonly for the intravenous injection of "606" and "914," but it is adapted equally well for the withdrawal of venous blood. The armlet is readily applied and the air can be pumped into it until the radial pulse is just not obliterated. In this way the maximum obstruction to the venous circulation is effected, without abolition of the arterial flow. When the puncture has been made the armlet can be deflated without causing the slightest movement of the patient's arm.

For several years I have used the portable sphygmomanometer known as the "Tyco" with very satisfactory results.

I am, Sir, yours faithfully,  
HILDRID CARLILL, M.A., M.D. Cantab., M.R.C.P. Lond.,  
Feb. 1st, 1917. Neurologist to the Royal Naval Hospital, Haslar.

#### LEAKAGE OF "NEURO-ELECTRICITY" AS A CAUSE OF TRENCH FOOT.

To the Editor of THE LANCET.

SIR.—In your issue of Jan. 13th Lieutenant C. Nepean Longridge quotes experiments which he has made with a view to showing that the condition known as "trench foot" is brought about by an undue leakage of some form of natural electrical energy from the extremities. Assuming his observations to be correct, they no doubt do show that a loss of what has been provisionally called neuro-electricity takes place under the conditions which obtain, or used to obtain, at the front during winter. They do not in themselves prove, however, that such loss is the cause of the pathological changes which occur. Neither, however, does the immunity of coolies in rice-fields disprove the theory. Heat regulation in warm-blooded animals is a complex process, for the proper working of which the integrity of the nervous system is, among other things, necessary. If this heat-regulating mechanism be artificially interfered with the animal experimented on quickly dies—unless means are taken to keep up its body heat by regulation of the external temperature. In the case of the coolie the temperature of the water is nothing like so low as it is on the Western front in the winter. Moreover, the coolie is inured to the work from childhood, and the adaptive power of the nervous system is well known.

It may be accepted that "loss of neuro-electricity" is not the direct cause of trench foot; but that the loss, if it occurs, interferes with the local nervous mechanism for heat regulation is not improbable. It is a well-known fact that limbs with a damaged nerve-supply due to gunshot injury become blue, congealed, and even ulcerated if exposed to a degree of cold which would not affect them normally; whereas in really warm weather—or even for a short time after a hot bath—their appearance is natural. Low external temperature, in short, does not affect a limb injuriously so long as the heat-regulating mechanism is capable of maintaining the normal internal temperature. But the balance may be adversely disturbed either (a) by a degree of external cold sufficient to overcome the normal arrangements—e.g., frost-bite; or (b) by a less degree of cold acting upon an enfeebled mechanism. Oiling the feet is certainly of value. It does not appreciably "keep the cold out," but may conceivably "keep electricity in." The success of such a measure is therefore a point in favour of Lieutenant Longridge's hypothesis.

I am, Sir, yours faithfully,

FRANCIS HERMAN-JOHNSON.

Cavendish-square, W., Jan. 30th, 1917.

#### THE GLYCOSURIA ASSOCIATED WITH MENINGITIS.

To the Editor of THE LANCET.

SIR.—The case of suppurative meningitis with coma and glycosuria reported in THE LANCET of Feb. 3rd by Dr. F. E. Taylor and Captain W. H. McKinstry render the following observations of interest. In two cases of epidemic cerebro-spinal meningitis recently under our care in the London Fever Hospital we took the opportunity to examine the urines and the cerebro-spinal fluids for glucose from the onset of the disease. We found that during the first three days the urine contained small amounts of glucose, but that this substance was completely absent from the cerebro-spinal fluid. After the third day, when the acute invasive

symptoms were subsiding, the reverse was the case. The osazones were prepared from these fluids and were characteristic of glucose. Both cases proved fatal. In a third case recently under the care of one of us, temporary glycosuria was present in the early stages of a relapse. This relapse terminated in hydrocephalus and also proved fatal.

Some time ago Dr. Archibald Garrod drew attention to the fact that glycosuria was not infrequent in the terminal stages of tuberculous meningitis. Our cases were all meningococcal and the glycosuria, instead of being terminal was initial and transitory. In this respect they correspond more closely with the case of suppurative meningitis reported in your columns, and it seems unfortunate that in this the cerebrospinal fluid was not bacteriologically examined during life.

Our cases are too few for us to attempt to base any evil prognostic importance on this early glycosuria in cerebrospinal meningitis. As regards the occurrence of acetonuria this is so common in acute specific fevers where the constitutional disturbance is of any severity that it is deprived of any special significance.

We are, Sir, yours faithfully,

CHARLES R. BOX,

THOMAS G. NICHOLSON.

### THE ABNORMAL SIZES OF OFFICIAL PUBLICATIONS.

To the Editor of THE LANCET.

SIR.—The Stationery Department of the War Office from time to time issue pamphlets for the guidance of medical officers. I would like, through the courtesy of your columns, to make the following suggestions for future issue of these pamphlets.

They should be of a uniform size, with a margin for notes; perhaps, on the whole, "quarto" size would be the best form, failing that "octavo" size. I have on my desk at the present moment pamphlets varying in size from foolscap to booklet ( $5\frac{1}{2} \times 4$ ). As most of these pamphlets are of considerable value in helping the medical officer to be up to date, it is desirable they should be so "made up" that they could be bound together and form a standard work of reference. At the present time it is found that they are read, perhaps only glanced at, and put away—not to be found when wanted. This I attribute in part to the "make up," which does not lend itself to any standard system of filing or binding.

I am, Sir, yours faithfully,

Jan. 30th, 1917.

#### MED. SERVICES.

\* \* We sympathise whole-heartedly with our correspondent. The War Office publications only offend in the same way as all official publications. The sizes and shapes of the Reports of Medical Officers of Health and of the authoritative documents from all the great departments are bewilderingly varied, making comparative reference and convenient housing impossible.—ED. L.

### THE PRE-WAR MEDICAL OFFICER (S.R.) AND (T.).

To the Editor of THE LANCET.

SIR.—May I through the medium of THE LANCET draw attention to the following points?

1. (a) The consolidated rate of pay of the new-joined temporary officer R.A.M.C. is approximately equal to the total pay and allowances of the Special Reserve and Territorial Captain. The former is either new-qualified or has had opportunities to minimise his losses; the latter has in many cases, if he was called up on mobilisation, to support wife and family solely upon his pay and allowances. The rise in the cost of necessaries at home presses hard upon families now. (b) The Special Reserve officer who joined in the early days of its formation received £20 kit allowance on joining. The war has now lasted two and a half years. The cost of kit has risen. The medical officer who has served with an infantry regiment in winter trenches on the Somme offensive has got through much clothing since the war began! (c) The Special Reserve or Territorial officer if wounded loses the greater part of his allowances; the "temporary" maintains his consolidated rate of pay. (d) The "temporary" is entitled to a fortnight's leave on the renewal of his contract without prejudice to his consolidated pay. The Special Reserve or

Territorial officer gets but his 8 or 10 days' leave, and is liable to deduction of allowances.

2. The following suggestions are made:—(a) Any Special Reserve or Territorial officer, R.A.M.C., who has not less than two years' active service abroad, shall, upon completion of six years' service, commence to draw the pay and allowances of a Captain, R.A.M.C., of seven years' service. (b) Any Special Reserve or Territorial officer with not less than two years' active service abroad, of which not less than one year has been with an infantry regiment in the line, shall be eligible for a kit gratuity equal to the difference between the amount of his kit allowance on joining and £50. (c) Any Special Reserve or Territorial officer shall draw his full pay and allowances during such time as he is unfit for duty by reason of wounds received in action. All the above to be retrospective.

3. It is submitted: (a) that the principal cases of hardship would be alleviated; (b) that the number of such cases is sufficiently small to render the charge upon the public not great enough to militate against the adoption of the above suggestions.—I am, Sir, yours faithfully,

Jan. 26th, 1917.

IN ARDUIS.

### Obituary.

HENRY HUMPHREYS, M.A., M.D. CANTAB.,  
M.R.C.P. LOND.

Henry Humphreys, who died at Richmond on Jan. 16th at the age of 72, was a man of brilliant talents, who, had it not been for his weak health, might well have attained great distinction. He was the son of Mr. Charles Humphreys, an architect. Educated at the City of London School. Henry Humphreys proceeded to St. John's College, Cambridge, where he graduated as Fifth Wrangler, proceeded to the M.A. degree in 1870, and became a Fellow of his college. He studied medicine at University College, London, qualified in 1872, took his M.D. in 1875, and the M.R.C.P. in 1877. In 1873 he joined the Middlesex Hospital, where, after holding the posts of house physician and obstetric house physician, he was appointed medical registrar, and prepared the interesting and carefully compiled reports for 1875 and 1876. In 1877 he married a daughter of Dr. E. Duncan, and in the same year went to reside at Manchester, having been appointed physician to the Pendlebury Hospital for Sick Children. He threw himself *con amore* into his new duties, and had already given promise of good scientific work, when, under unforeseen trials, his health broke down, and he was compelled to resign office after three years' tenure and abandon a career for which he was eminently fitted. For the next ten years he practised as a physician at St. Leonards, where he was attached to the hospital, and after that for five years at Fleet, and finally at Torquay, whither he removed in 1888. Here for another decade he spent a quiet and industrious life, not overburdened with practice, and taking much interest in the Natural History Society and Museum, of which he was president. His last work was to prepare an elaborate study of mosses for a meeting at Launceston, where the first symptoms of another breakdown occurred, which necessitated his retirement from active work, and from which he never entirely recovered. For nine years he was devotedly tended by his wife. He died after a few days' illness from heart failure.

Dr. Humphreys was a man of fine character, modest and retiring, and thoroughly unselfish. During his hospital life he proved to be a shrewd observer, keen and enthusiastic in the pursuit of clinical medicine. It was a disappointment to his London friends, as it must have been to himself, that his career at Manchester was so abruptly cut short from no fault of his own.

AN important informal conference between representatives of various Government departments and public bodies was recently held under the chairmanship of Lord Balfour of Burleigh, when a proposal by the medical adviser to the Insurance Committee for the County of London for a national scheme for the after-care and employment of tuberculous persons was discussed. A small committee was nominated to consider what further action should be taken in the matter.

# The War.

## THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue :—

### Died.

Capt. B. D. Gibson, Australian Light Horse, who was acting as a combatant officer, qualified in Ireland in 1904, and had held public appointments in Dublin and in Cape Colony.

### Wounded.

Capt. C. H. Lilley, R.A.M.C.  
Lieut. Balkrishna, I.M.S.

## DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war :—

Major J. E. Moir, Indian Cavalry Staff, Cavalry Brigade, youngest son of the late Dr. Moir, of St. Andrews, N.B. Second Lieut. E. E. Brannigan, West Yorks Regiment, son of Major J. H. Brannigan, R.A.M.C., of County Mayo, Ireland.

Transport Officer J. E. McElpatrick, only son of Dr. J. McElpatrick, of Alderley Edge, Cheshire.

Capt. M. G. Donahoo, M.C., King's Own Yorkshire Light Infantry, only son of the late Dr. T. M. Donahoo.

Lieut. R. J. Graves, Royal Irish Rifles, elder son of the late R. W. Graves, F.R.C.S., J.P., of Gloucester.

## OBITUARY OF THE WAR.

### CHARLES EDWARD RECKITT, L.M.S.S.A. LOND., SURGEON, ROYAL NAVY.

Surgeon C. E. Reckitt, who died on Jan. 20th as a result of illness contracted on active service, was 30 years of age and the elder son of Lieutenant-Colonel J. D. T. Reckitt, R.A.M.C. He was born at Bellary, India, educated at Bedford Grammar School and Berkhamsted School, entering at Guy's Hospital for his medical study in 1905. Qualifying in 1913, he was assistant house surgeon at his own hospital and held the post of ophthalmic house surgeon at the Hull Royal Infirmary. In April, 1915, he joined the Royal Navy, leaving Haslar a month later on his appointment to H.M.S. *Shannon*. He was senior surgeon on this boat when,

at the beginning of December last, he developed cellulitis of the forehead. After several operations osteomyelitis of the frontal bone was succeeded by a subdural abscess and he was transferred to Haslar Hospital where he died. Surgeon Reckitt's personal qualities are well described by a hospital intimate : "I first came across Surgeon Reckitt," he writes, "in the swimming-bath, where I was struck by his neat, well-knit figure and his good diving, which won many prizes

at the 'Guys' water sports. Later on he was dresser to Mr. Philip Turner and a member of Sir Alfred Fripp's firm. To us he was always 'Charles'; no surname seemed to be necessary, for he was the life and soul of any firm he was on. Quick and alert, merry and jovial through the longest night's work, he seemed tireless and full of energy in the small hours when no one is supposed to be a hero. With his patients he was painstaking and careful, but he added to his treatment a kindly word and a most infectious smile that will make him remembered for many a day."

Surgeon Reckitt married in July last Madeleine Violet, younger daughter of Mr. de Quetteville, of Jersey.

### FRANK ERNEST ROCK, M.D. LOND., D.P.H., SURGEON, ROYAL NAVY.

Surgeon F. E. Rock was one of two Naval surgeons aboard H.M.S. *Laurentic*, which went down off the Irish coast on Jan. 25th. After a brief career as a student at Middlesex Hospital, from which, in 1893, he graduated with honours in medicine and obstetric medicine at London University, taking his doctorate in the following year, Dr. Rock was for a time assistant medical officer at Huddersfield, leaving in 1908 to organise the medical work amongst the 14,000 children in the public elementary schools of Edmonton, where, four years later, he became assistant medical officer of health and assistant school medical officer. In his early days, after a period of private practice in Hammersmith, he had served in the Royal Navy, and as a member of the Special Reserve of Officers was called up when the British Fleet was mobilised in July, 1914, and again for active service the following month. He worked hard, at first at Chatham Naval Hospital, later on board H.M.S. *Wallaroo*, before joining H.M.S. *Laurentic*, on which he lost his life, his colleague, Surgeon W. P. Starforth, being rescued. A colleague of Surgeon Rock's writes of him : "His modest bearing and unassuming manner made him a host of friends wherever he went, and by all of these his death will be deeply regretted."

### PERCY ARNOLD LLOYD-JONES, B.A., M.B., B.C. CAMB., D.S.O., MAJOR, ROYAL ARMY MEDICAL CORPS.

Major P. A. Lloyd-Jones, who was killed in action in France on Dec. 22nd last at the age of 40 years, was son of Mr. E. Lloyd-Jones, of Abbotshill, Great Malvern, formerly of Sale. Educated at Manchester Grammar School, he graduated at Cambridge in 1898, going on to St. Bartholomew's Hospital for his clinical studies, qualifying M.R.C.S. & L.R.C.P. Lond. in 1904. After a house appointment at Bedford County Hospital he entered the Royal Army Medical Corps at once, becoming Captain in 1908 and Major in 1915. He had seen a variety of service, as he volunteered as a private in the Yeomanry during the South African War, being awarded the Queen's medal with three clasps and entering Pretoria with Lord Roberts. On his return he was made honorary member of the borough of Cambridge. Later, when stationed at Malta, he rendered assistance at the Messina earthquake and was decorated with the Red Cross medal and the Order of the Crown of Italy. He went over to France in the early days of the present war, was appointed to the command of a field ambulance with the temporary rank of Lieutenant-Colonel, and became Deputy Assistant Director of Medical Services. He was twice mentioned in despatches and received the D.S.O. in June last. His death was due to a chance shell which hit him when busied with work just behind the firing line.

Major Lloyd-Jones is described by his commanding officer as an exceptionally brilliant staff officer and an honourable, upright, and hard-working official. His life



record shows a remarkable range of activities at home and abroad, while letters which we have seen speak of his sense of duty and love of home and children. A wide circle of friends will mourn their loss.

#### THE HONOURS LIST.

The following promotions of and awards to medical officers are announced:—

C.B.

Col. (temp. Surg.-Gen.) G. D. Hunter, C.M.G., D.S.O., A.M.S.; Lt.-Col. P. B. Haig, I.M.S.

D.S.O.

Maj. (temp. Lt.-Col.) W. Benson, R.A.M.C.; Lt.-Col. (temp. Col.) F. B. Gunter, R.A.M.C.; Lt.-Col. (temp. Col.) C. A. Johnston, C.I.W., I.M.S.; Capt. G. J. Keane, R.A.M.C.; Lt.-Col. (temp. Col.) G. W. Tate, R.A.M.C.; Lt.-Col. R. F. Turner, I.M.S.; Lt.-Col. H. A. Moffat, S. Afr. Med. Corps; Temp Lt.-Col. C. H. Muller, S. Afr. Med. Corps; Lt.-Col. W. B. Skinner, S. Afr. Med. Corps; Lt.-Col. J. H. Whitehead, S. Afr. Med. Corps.

*Military Cross.*

Capt. R. S. Kennedy, I.M.S.; Capt. C. V. Thornton, R.A.M.C.; Capt. H. Payne, S. Afr. Med. Corps.

#### MENTIONED IN DESPATCHES.

The *London Gazette* publishes a lengthy list of additions to and corrections in the names of those mentioned in recent despatches, and the following affects the lists published in THE LANCET:—

*Mesopotamia* (THE LANCET, July 8th, 1916, p. 79).—Add the name of Major W. C. Croly, R.A.M.C.

*Mediterranean* (THE LANCET, July 22nd, 1916, p. 163).—Under the heading of "Royal Army Medical Co-op." for Major W. Jones read Major W. W. Jones (T.F.); for Capt. R. Hobson read Capt. R. Hobson (T.F.).

*British Army in France* (THE LANCET, Jan. 13th, p. 83).—Under the heading of "Canadian Army Medical Corps," delete the name of Major E. H. Baylock (not a medical officer).

#### THE MOBILISATION OF THE MEDICAL PROFESSION.

Mr. Neville Chamberlain, the Director-General of National Service, made on Tuesday last a statement as to the direction in which his plans might be expected to mature so as to obtain from the general population services of all kinds. In the course of his address he said:—

There are two classes which stand apart from the rest of the community, because their services are required in particular directions. I refer to doctors and ministers of religion. So far as the clergy of the Church of England are concerned, I have been in communication with the Archbishops, and we have formulated plans which I hope will enable many clergy to give effect to what I know to be their desire, and to offer themselves for national service other than that connected with their parishes. They will be put to do work of a special character, perhaps in different parts of the country. As to doctors, I have been in touch with the General Medical Council, and, although my plans are not yet completed, I hope it will be possible for me to arrange something for them on analogous lines. We have to see that the doctors are so mobilised and distributed that the needs of both the civil population and the Army can be met, and that, so far as possible, specialists can be put to do the work for which they have taken pains to fit themselves. With those exceptions, I am going to appeal to the whole male population of this country between the ages of 18 and 61.

Readers of THE LANCET will not be surprised at learning the decision of the Director-General of National Service to treat the medical profession as one whose utility to the nation is so special along definite lines that any attempt to use its personnel outside medical lines must be bad economy. On the other hand, the life of the medical practitioner is necessarily so intimately bound up with the fortunes of those among whom he lives that mobilisation of the medical profession, in the strict sense of the word, must be far more difficult for all concerned than it would be in connexion with any other occupation.

The Director-General of National Service will find the medical profession considerably prepared for the economising of man power and the distribution of work which he proposes to bring about. The Central Medical War Committee has since its foundation been impressed with the necessity, while discharging its primary duty of finding officers for the military and naval services, of arranging that the medical practice of the country, both in public departments and in individual undertakings, shall proceed with due efficiency and with the minimum of inconvenience or distress to the public. The Central Committee in a communication

to the Local Medical War Committees (now being issued) asks those Committees to submit the names of all men of military service age in their areas, pointing out that a great strain must shortly fall on the remaining members of the medical profession, and that medical services will have to be cut down to the really essential basis. The military authorities have a legal claim on the services of every man of not more than 41 years of age at the dates appointed by the Military Service Acts, and the Central Medical War Committee indicates that the public must be prepared to do with less medical attendance, just as they are having to acquiesce in many other forms of shortage.

It is understood that the Insurance Commissioners are informing the Insurance Committees throughout the country that they must be prepared to deal promptly and effectively with the demands that will be made upon them for the release of all practitioners under contract with them who can be spared, and the co-operation of the National Insurance Commission with the Central Medical War Committee has been throughout of an encouraging and remarkably efficient character. The Central Medical War Committee is advising the Local Medical War Committees that in every area the action of local authorities with regard to the medical men under contract must depend on the extent to which the local profession can show hearty co-operation. The authorities have the duty of providing certain medical services, and are expected to pay the practitioners under contract with them during their absence on military service; but these emoluments cannot be continued unless the work is carried out by someone. Fully recognising this, the Central Medical War Committee is suggesting to the Local Medical War Committees the methods by which the manpower of each area can be minimised, while satisfying the local authorities in their legitimate demands. The institution of co-operative central arrangements is proposed, whereby patients may attend at central surgeries, or whereby groups of doctors may undertake in common the attendance of all patients in one particular area, and it is to be hoped that the public will be ready to fall in with all such plans. The public support will certainly be given more readily by as much as those who work the local practices as substitutes are able to do so from those premises where the medical services had been previously rendered. It is obvious that much can be done to lessen night and emergency calls by an arrangement whereby one or two men in an area should be on duty on certain nights or at certain times.

The Central Medical War Committee goes, in its suggestions, further than anything which Mr. Neville Chamberlain was able at the time to say in public, for every medical practitioner who is capable of doing any medical work at all is considered by the Committee to be liable to be called upon to do what lies in his power.

#### THE ARTIST AT THE FRONT.

The second instalment of the *Western Front*, which is published under the authority of the War Office by "Country Life," Limited, and George Newnes, Limited, contains 20 further illustrations by Mr. Muirhead Bone, and it is our impression that the scenes in this issue may make a more popular appeal than those which appeared in the first instalment. The special qualities of the artist are wonderfully exemplified in such pictures as No. 29, "British Troops on the March to the Somme"; No. 32, "Wrecked Aeroplane near Albert"; and No. 34, "Watching our Artillery Fire on Trones Wood." This picture, drawn from Montauban, most graphically depicts a battlefield where artillery fire has been heavy, craters being massed together as the result of high-explosive shells following with great frequency. Little imagination is necessary to realise how, at a later stage in bombardment, these craters, like pits in confluent small-pox, overlap, making the shell-lodged ground become soft and loose; the illustration really, if remotely, indicates some of the difficulties with which our troops have to contend. "A View Outside Arras," No. 38, could only have been drawn by an artist with real feeling as well as dexterity, and none save those quite unfamiliar with the real objects of the black-and-white draughtsman will be betrayed into thinking that its slapdash execution shows any lack of care or design. In No. 24, "Taking the Wounded on Board," Mr. Muirhead Bone gives us an example of his well-known skill in the drawing of buildings; and

this is more definitely displayed in 21, "A View of Amiens Cathedral," a wonderfully elegant and airy presentation, with aeroplanes flitting round the *flèches*, and in 37, "A Gateway at Arras," a vigorous piece of impressionism. An exhibition of the original drawings has now been opened at the galleries of Messrs. Colnaghi and Obach, 144, New Bond-street, W.; it is held on behalf of public funds for the prosecution of the war.

## AUXILIARY R.A.M.C. FUNDS.

Lieutenant-Colonel F. W. H. Davie-Harris, R.A.M.C., secretary of the Auxiliary R.A.M.C. Funds, 124, Victoria-street, S.W., sends us the following statement and encloses a list of donations received for the year 1916 for the Officers' Benevolent Branch of the above funds:—

The committee of the above funds are now prepared to receive and consider applications for assistance from the guardians of orphans in straitened circumstances of officers of the Auxiliary R.A.M.C. (the Special Reserve, Territorial Force, and the New Armies) who are eligible, their fathers having been killed in action, died of wounds or disease contracted in the service, or have held their commissions in the Auxiliary R.A.M.C. during the present war.

The object of the Officers' Benevolent Branch is to afford relief to those orphans of commissioned officers who may be left under circumstances of peculiar distress or who may be enabled by a small addition to their incomes, at a certain period of their lives, to procure a better education than their limited means would otherwise admit.

As the committee expect to receive a large number of applications, it is hoped that all those officers who have not yet become subscribers will kindly do so and so help, with timely assistance, to give a start in life to the orphans of their brother officers.

*List of Donations received for the Officers' Benevolent Branch of the Auxiliary R.A.M.C. Fund during the Year 1916.*

(Donors of £15 1s. become Life Members under Rule 11.)

	£ s. d.		£ s. d.
Anderson, W. B., Lieut.	1 1 0	Douglas, Claude, Lieut.-Colonel	5 5 0
Angus, H. B., Lieut.-Col.	5 5 0	Duke, A., Dr.	5 5 0
Armstrong, F. G., Capt.	2 2 0	Donald, Archibald, Capt.	5 5 0
Arnison, W. D., Major	3 3 0	Davidson, P., Major	2 2 0
Ashbourns, R. J., Major	5 5 0	Dobson, Leonard C., M.D.	3 3 0
Alderson, W. E., Capt.	2 2 0	Dewar, W. J., M.D.	2 2 0
Anonymous	3 0 0	Dick, F. A., Captain	5 0 0
Appleton, O. L., Major	1 1 0	Darlow, F. C., Captain	1 1 0
Atkinson, Ambrose, Dr.	5 0 0	Bilwood, Captain	5 5 0
Buckley, T. W., Major	10 10 0	Everett, C. J., B.Q.	2 2 0
Bulling, H. G., Lieut.-Colonel, C.B.	50 0 0	Farquharson, A.C., Maj.	20 0 0
Broadford, Sir J. Rose, Colonel, K.C.M.G., C.B.	6 5 0	Grey, Edgar, Captain	5 5 0
Bannatyne, J. A., Lieut.-Colonel	5 5 0	Gibbons, Arthur P., Lieut.	3 3 0
Barr, Sir James, Lieut.-Colonel	10 10 0	Gourlay, W. B., Captain	2 0 0
Brook, W. F., Major	52 10 0	Grawe, T., Lieut.-Col.	10 10 0
Buzzard, H. F., Captain	5 5 0	Gibbs, T., Lt. & Qr. Mr.	1 1 0
Blackwell, A. S., Capt.	6 5 0	Gardiner, A. F., Dr.	10 0 0
Bolam, R. A., Lieut.-Colonel	3 3 0	Hamilton, D. L., Lieut.-Colonel	5 5 0
Blake, V. H., Captain	5 5 0	Hawkins, H. P., Lieut.-Colonel	5 0 0
Battie, T., Lieut. Col.	11 11 0	Haslam, W. E., Lieut.-Colonel	6 6 0
Broad, B. W., major	11 11 0	Holt and C., Messrs.	15 0 0
Banks, Walter, Lieut.-Colonel	3 0 0	Hay, S. H., Captain	5 5 0
Buckley, C. W., Major	1 1 0	Hay, A. G., Lieut.-Col.	10 10 0
Butcher, W. Herbert, T. Surgeon R.N.	5 0 0	Hunt, Marv. Dr.	2 2 0
Bigshawe, Arthur, Dr.	2 2 0	Hurry, J. B., Dr.	2 2 0
Barrett, A. Kepple, Esq.	2 2 0	Hund, Frank, Dr.	2 2 0
Barrett, Mary, Miss	1 1 0	Hurst, A. F., Lieut.-Colonel	10 10 0
Bower, David, Dr.	5 5 0	Jones, W. W., Major	1 1 0
Rennison, J. M., Dr.	2 2 0	Kendrick, H. H., Capt.	5 0 0
Batt, Bernard E. A., Captain	5 0 0	Kelly, A. Brown, Capt.	10 10 0
Bethell, Stanley E., Lieut.	2 2 0	Kay, Richard, Dr.	2 2 0
Collier, W., Lieut.-Col.	52 10 0	Kinney, Dr. Foster, New York	20 0 0
Crawford, Douglas, Captain	10 10 0	Leham, Arthur, Capt.	1 1 0
Coates, William, Colonel	5 5 0	Littledale, H., Major	5 5 0
Crawford, D. G., Lieut.-Colonel	5 0 0	Lickey, J. D., Captain	1 1 0
Clarke, P. S., Captain	2 2 0	Leach, J., Major	5 5 0
Cory, E. J. T., Major	10 10 0	Livingstone, T. H., Capt.	3 3 0
Cook, John E., Captain	3 3 0	Lyle, R. P. Rankin, M.J.	5 5 0
Cohen, Abraham, Dr.	2 2 0	Lewis, Cyril, Major	3 3 0
Cooke, E. S., Dr.	3 3 0	Lunn, W. E. C., Capt.	5 0 0
Cox, Alfred, Dr.	1 1 0	Tiley, J. A., Captain	4 4 0
Cole, Charles G., Dr.	5 0 0	Lounsbury, R. C., Captain	2 2 0
Charleworth, F., Major	5 5 0	Lucas, Albert, Major	5 5 0
Crusford, Raymond, Dr.	2 2 0	Lane, Sir W. A., Lt.-Col.	52 10 0
Clarke, J. Michell, Lieut.-Colonel	3 3 0	Laurie, James, Captain	3 3 0
Dalton, Norman, Lieut.-Colonel	2 2 0	Lynden, Arnold, Dr.	10 0 0
Lapage, C. P., Captain	5 5 0	Lapage, C. P., Captain	5 5 0

	£ s. d.		£ s. d.
Laing, G. D., Dr.	5 5 0	Robertson, A. G., Capt.	1 1 0
Lindsey, C. D., Captain	1 1 0	Smith, H. H., Captain	5 0 0
Mansell-Mullin, C. W., Lieutenant-Colonel	2 2 0	Slater, B. H., Captain	1 1 0
Maclean, Ewen, Major	21 0 0	Seymour, W., Captain	2 2 0
Mills, T. J., Captain	3 3 0	Stane, H. J., Captain	3 3 0
Makins, Sir G. H., Surg.-Gen., K.C.M.G., K.C.V.O.	10 0 0	Slight, J. D., Major	10 10 0
Macmillan, D. J., Major, C.B., M.V.O.	5 0 0	Spriggs, N. I., Captain	2 2 0
Mours, T. K., Major	10 10 0	Sedgwick, H. R., Capt.	5 5 0
Middleton, G. S., Lieutenant-Colonel	10 10 0	Sleator, T. S., Captain	1 1 0
Menzies, J. A., Captain	1 1 0	Smith, J. W., Lieut.-Col.	10 10 0
Murray, P. J., Lieut.	1 1 0	"Sigma," ...	6 6 0
Mackay, B., Captain	4 4 0	Short, T. Sidney, Major	5 5 0
Martin, A. M., Lt.-Col.	5 5 0	Stirling, R., Major	5 5 0
MacDermott, W., Lieutenant-Colonel	10 10 0	Stoble, W., Captain	5 5 0
Manfield, A. H., Capt.	5 0 0	Southam, F. A., Lt.-Col.	5 5 0
May, Ott., Dr.	5 5 0	Smith, R. Pye, Esq.	2 2 0
Mievile, G. C. B., Dr.	5 5 0	Singer, Charles, Capt.	5 5 0
McAfee, D. J., Captain	1 1 0	Thorne, Atwood, Surg.-Col., V.D.	5 5 0
Medical Insurance Agency	50 0 0	Tooth, H. H., Col., C.M.G.	5 5 0
Martin, H. C., Captain	2 2 0	Toogood, F. S., Major	1 1 0
Macfarlane, J., Captain	1 1 0	Thomson, R., Captain	2 2 0
Nelligan, G. E., Captain	3 3 0	Taylor, H. H., Captain	5 5 0
Oliver, Sir William, Lieut.-Colonel, Bart.	10 10 0	Telford, E. D., Captain	28 5 0
Oliver, H., Gordon, Captain	5 0 0	Thomas, F. G., Captain	6 5 11
Percy, Sir William Osler, Lieutenant-Colonel	140 0 0	Tirard, Sir Nestor, Lt.-Col.	5 5 0
Pasteur, F. M., Lieut.-Colonel	5 5 0	Turner, W., Captain	5 5 0
Patterson, D. Wells, Major	5 5 0	Turner, G. G., Major	4 4 0
Parkins, A., Major	5 5 0	Thomson, A., Esq., M.D.	2 2 0
Pybus, F. C., Major	3 3 0	Vacher, H. R., Lt.-Col.	21 0 0
Penny, F. S., Colonel	5 5 0	Wrestmacott, F. H., Lieut.-Colonel	32 10 0
Pratt, R., Lieutenant-Colonel	2 2 0	Woodrow, J. B., Capt.	5 5 0
Page, Dennis S., Captain	5 5 0	Walsh, Leslie H., Capt.	10 10 0
Petrew, E. I. P., Capt.	10 10 0	Wickens, H. F., Capt.	3 3 0
Paulley, Legge, Dr.	4 4 0	White, W. Hale, Lieut.-Colonel	5 5 0
"J. G. P."	4 4 0	Warrington, W. B., Captain	2 2 0
Roe, R. W. H., Lieutenant-Colonel, D.S.O.	4 4 0	Webb, Cholmondeley, Captain	10 10 0
Bligh, V., Captain	5 5 0	Weir, Hugh B., Captain	10 10 0
Rowlands, R. P., Capt.	5 5 0	Wheeler, H. L. D., Lieut.	1 1 0
Richardson, W. G., Lieutenant-Colonel	5 5 0	Wilson, W. Frank, Capt.	5 5 0
Russell, J. W., Major	5 5 0	Wild, Robert B., Major	5 5 0
Bowcroft, G. F., Colonel	10 0 0	Winkfield, Alfred, Esq., F.R.C.S.	2 2 0
		Wilson, Howard, Esq.	5 5 0
		Wear, A. B., Lieut.-Col.	1 1 0
		Young, A., Captain	15 0 0
		Yates, R. B., Captain	5 0 0

## THE DIRECTOR-GENERAL OF THE ARMY MEDICAL SERVICE AND THE ARMY COUNCIL.

Lord Esher, in a letter to the *Times*, has warmly advocated inclusion in the Army Council of the Director-General of the Army Medical Service, and this would be a step which all medical men would recognise to be in the right direction. No one wishes to encumber the Army Council with too many representatives, but the progress of this war has shown us over and over again that it is difficult for a military officer to perceive the difficulties which must arise in a specialised and technical department. Yet unless the difficulties are perceived the remedies cannot be arrived at. The bestowal by the King on Sir Alfred Keogh of the high distinction of the Grand Cross of the Bath is a public acknowledgment of the way in which the Royal Army Medical Corps, supported from the outset by the efforts of the medical profession as a whole, has discharged its onerous work, and Lord Esher's appeal to the Secretary of State for War further to recognise this work by admitting the Director-General of the Army Medical Service to the Army Council is a very just piece of argument.

**HOSPITAL MAGAZINES.**—Everyone would rejoice if Lieutenant-Colonel Fayerre, the Commanding Officer of the 2nd Scottish General Hospital, should prove prophetic in his foreword to the February issue of the *Craigleath Hospital Chronicle* (Edinburgh, price 6d.), for he believes that it will be the last foreword he will be asked to contribute. The contents of the paper are of the creditable standard of its predecessors.—The February issue of the *Gazette of the 3rd London General Hospital* (Wandsworth, price 3d.) announces the return of Lieutenant-Colonel Bruce-Porter, C.M.G., as officer commanding. Lieutenant-Colonel Sir Alfred Pearce Gould, K.C.V.O., having filled the post in his absence. Most of the contents of this issue relate to the Christmas festivities, the illustrations being excellent.—We have also received No. 2, Vol. I., of the 5th, the magazine of the General Hospital

bearing that number (price 3d.). It is a satisfactory production, modelled somewhat on the style of the *Gazette of the 3rd London General Hospital*. In the article entitled "In Defence of the R.A.M.C." the author points out that the Corps has its full quota of heroes who have earned distinction for deeds of self-sacrificing devotion—a thesis which no one will deny.

**HEADQUARTERS** Southern Command have accepted the services of Mr. John R. Rolston as honorary consulting ophthalmic surgeon to the Plymouth garrison.

**THE ST. DUNSTAN'S HOSTEL** for blinded sailors and soldiers has benefited to the extent of £5000 devoted by Messrs. Kidder, Peabody, and Co., of New York and Boston, for the relief of sufferers from the war.

**RELATIVES** visiting sick and wounded sailors and soldiers have been granted the concession of single fare at the old rate for the double journey on the production of the hospital authorisation.

**ULSTER VOLUNTEER FORCE HOSPITAL.**—On Feb. 2nd the Duchess of Abercorn opened a new wing in connexion with the Ulster Volunteer Force Hospital, Belfast, which is to be devoted to the care of limbless patients and those needing special joint treatment. Mr. A. B. Mitchell has been appointed to take charge of the patients by the War Office, with the rank of temporary Lieutenant-Colonel.

## Medical News.

**EXAMINING BOARD IN ENGLAND BY THE ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.**—As the result of the Final Examination held from Jan. 9th to 24th the following candidates were approved in the undermentioned subjects, but are not yet eligible for the diplomas:

**Medicine.**—G. Adler, London; H. D. Apergis, Guy's; D. N. Baan, Calcutta and University College; H. E. Bickerton, Cambridge and Liverpool; A. H. Bon, Northwestern University, Chicago; Marian Noel Bostock, St. George's and Royal Free; J. B. Brash, Cambridge and St. Bartholomew's; I. Braun, St. Bartholomew's; C. J. Chesterman, Bristol; H. J. C. Churchill, St. Bartholomew's; A. M. Clement, St. Thomas's; J. C. Collins, London; W. T. Cooper, Charing Cross; R. S. Corbett, Cambridge and St. Bartholomew's; G. R. Cowie, Oxford and Middlesex; W. L. Dandridge and S. R. E. Davies, Cambridge and St. Bartholomew's; W. A. Drake, Leeds and St. Bartholomew's; F. S. Etholm, Bow in University; J. H. Ewen, St. Mary's; J. Fairbairn, Cambridge and London; H. Gainsborough, Cambridge and St. George's; M. W. Geffen, University College; G. H. Gladwin-Jackson, Cambridge and London; R. H. Glenny, St. Bartholomew's; E. F. S. Gordon, Cambridge and St. Bartholomew's; J. W. H. Grice, Guy's; H. O. Gunewardene, King's College; D. V. Halstead, Guy's; Joan Hardy, Royal Free; E. B. Hartley, Cambridge and St. Thomas's; K. K. Hill, University College; H. W. H. Holmes, Cambridge and St. Thomas's; J. C. C. Howe, Guy's; J. W. D. Hyde, University College; Loiza Johnston, American Medical Missionary College; J. I. Kubine, Charing Cross; H. W. Lewis, Middlesex; E. E. Llewelyn, Cambridge and St. Bartholomew's; L. G. Lunnon, Middlesex; B. Maclean, University College; N. H. S. Macler, Guy's; W. H. Mawling, University College; E. C. Moore, Liverpool and St. Thomas's; C. K. Mowll, London; C. P. Nagamuttu, Ceylon and Middlesex; T. M. Payne, Cardiff and St. Bartholomew's; A. H. Peart, Cambridge and St. Thomas's; A. M. Pickup, Birmingham and University College; C. V. Pink, St. Thomas's; W. L. F. Powell, London; H. N. Pritchett, Guy's; H. E. Rhodes, Cambridge and London; A. Rose-Innes, University College; A. H. Savory, St. Bartholomew's; J. J. A. Scott, Birmingham; R. Sims, London; E. D. Speckman, Cambridge and St. Bartholomew's; M. B. R. Swann, Cambridge and King's College; J. F. Twort, London; W. J. Walters, Cambridge and Guy's; P. Ward, Sheffield; F. E. G. Watson, St. Bartholomew's; H. G. Watters, London; W. J. White, St. Thomas's; and J. H. Wissman, A. F. Wyatt, and S. Yahilevitz, London.

**Midwifery.**—A. L. Abel, University College; H. C. Apperly, Middlesex; H. W. Archer Hall, Birmingham; H. S. Baker, St. Bartholomew's; Ruth Balfour, Royal Free; Althea Josephine Bolton, Birmingham; Marian Noel Bostock, St. George's and Royal Free; E. W. Bowell, Guy's; I. Braun, St. Bartholomew's; A. G. Brett, Liverpool; H. B. Bulen, Cambridge and St. Bartholomew's; G. T. Calthrop, Cambridge and London; D. Cameron, St. Bartholomew's; H. Carpenter, University College; B. R. Chaulk, St. Mary's; A. B. Cocker, Guy's; J. C. Collins and G. W. Combe, London; C. G. Coombs, Guy's; A. J. Copland and R. Cyte, St. Bartholomew's; C. Depta, Louvain and University College; H. L. Douglas and W. Kidman, London; M. Erzin, Cirencester; S. Finkelstein, Charing Cross; J. W. H. Gee, Guy's; Grace Mary Giulson, Griffith, Cardiff and Leeds; F. Herrington, Guy's; F. J. Harvey, Birmingham; F. Y. Hasaballa, St. Thomas's; C. B. Henry, Westminster; L. G. Higgins, Cambridge and St. Thomas's; T. C. Higgins, St. Bartholomew's; S. L. Higgs, Cambridge and St. Bartholomew's; J. Hollings, London; G. R. Hubbard, Guy's; Loiza Johnston, American Medical Missionary College; D. M. Jones, London; S. Kadinsky, Brussels and Westminster; J. G.

Lawn, Cambridge and St. Thomas's; H. W. Leathem, Cambridge and St. Thomas's; L. K. Ledger, St. Bartholomew's; A. W. Lewis, St. Mary's; D. J. A. Lewis, London; Marguerite Frances Jane Lowenstein, Royal Free; G. E. MacAlvey, St. Mary's; P. D. J. Milnans, Middlesex; R. S. Millar and J. O. R. Montonchon, Guy's; A. Moore, Manchester and Birmingham; C. K. Mowll, London; Annie Shortridge Miles, Royal Free; W. W. Newton, Birmingham; W. D. Nicol, St. Bartholomew's; J. M. Parry, Charing Cross; H. T. Pryce-Jones, Cardiff and St. Mary's; R. E. Rampling, St. Thomas's; P. Randall, Cardiff and St. Mary's; Gwenola Mary Reille and Sarah Sophie Rosenberg, Royal Free; J. Rowland, St. Thomas's; K. J. Rustome, Liverpool; J. F. Ryan, St. Thomas's; S. Sacke, London; J. J. A. Scott, Birmingham; G. R. Sharp, London; S. C. Shaw, Middlesex; M. O. Simon and K. L. Singer, Middlesex; B. L. Skoggs, St. Bartholomew's; E. H. B. Sparrow, Birmingham; H. J. R. Surrage, Cambridge and King's College; R. Thorne, London; A. R. Tohill, Charing Cross; R. E. S. Webb, Middlesex; A. G. B. Wilcock, Cambridge and St. George's; W. G. Woolrich, Cambridge and St. Thomas's; A. F. Wyatt, London; G. Zachariah, dasras; and I. H. Zierman, London.

**Surgery.**—P. A. Ashcroft, Manchester; D. C. Beaumont, Cambridge and London; W. T. Bewick, Cambridge and St. Thomas's; A. H. Binn, Northwestern University, Chicago; E. D. Bouter, Cambridge and University College; C. C. Caesterman, Bristol; G. F. Cobb, St. Bartholomew's; E. J. Coombes, St. George's; P. G. S. Davis, St. Thomas's; H. Gainsborough, Cambridge and St. George's; M. Gourevitch, Paris and London; Grace Mary Giulson, Griffith, Cardiff and Leeds; H. W. H. Holmes, Cambridge and St. Thomas's; C. Holt, Bombay and Middlesex; O. H. Hyman, St. Thomas's; Eleanor Joyce Partridge, Royal Free; R. E. Rampling, St. Thomas's; D. W. R. Richardson, Cambridge and London; and F. F. Tizard, Toronto.

**UNIVERSITY OF BRISTOL.**—At the Second Examination for the Degrees of M.B., Ch.B. (Part I.), held recently, the following candidates were successful:

Khai Way Chan, William Lorimer Cosham, Nan Susan Jolie Roberts, and Marjorie Wadsworth.

**ROYAL MEDICAL BENEVOLENT FUND.**—At the last meeting of the committee, held on Jan. 9th, 12 cases were considered, and £112 voted to 10 of the applicants. The following is a summary of the cases relieved:

Widow, aged 63, of M.R.C.S. Eng. who practised in Suffolk and Cambridgeshire, and died in 1914. Left quite unprovided for, and until recently earned a bare income by acting as nurse-midwife. About four months ago became ill, and is now suffering from paralysis, and the small amount of money saved is almost exhausted. Voted £12 in 12 instalments.—Widow, aged 75, of L.S.A. Lond., who practised in Bermonsey, and died in 1897. Applicant managed up to the commencement of the war by keeping a boarding-house on the south-east coast, but has had to close it down, and is still responsible for various charges against the house. Two children, who help all they can. Relieved once, £15. Voted £12 in 12 instalments.—L.R.C.P. & S. Edin., age 59, a widow, who practised in Dumbartonshire and is now suffering from spasmodic paralysis. Only income a pension from the National Hospital of £20. Has one son, who is training for a dentist, and whose fees have been provided by the Fund and Guild. Received 12 times, £144. Voted £12 in 12 instalments.—Widow, aged 63, of L.R.C.P. Irel., who practised at Buckley and died in 1905. Applicant was totally unprovided for, and had been an invalid for many years and unable to work. One daughter married and unable to help. Only income a pension from the society of £25. Relieved nine times, £108. Voted £12 in 12 instalments.—Widow, aged 77, of M.R.C.S. Eng. who practised at Runcorn and Swanson and died in 1914. Applicant was left unprovided for, and is suffering from mitral stenosis and unable to help herself. One daughter, now eight years old. Applicant lives with her mother, whose means are very limited. Relieved twice, £24. Voted £12 in 12 instalments.—Widow, aged 54, of M.R.C.S. Eng. who practised in Devonshire, and died in 1914, and was an annuitant of the Fund. Applicant was left without means, and finds it very difficult to obtain suitable work on account of ill-health and age. One daughter, aged 22, who is in domestic service. Relieved four times, £28. Voted £12 in 12 instalments.—Daughter, aged 50, of M.R.C.P. Lond., who practised in London and died in 1910. Applicant lost practically all her income through a defaulting trustee, and has now only £16 per year. Her health is very precarious. Her mother, who was helped by the Fund, has recently died. Relieved three times, £40. Voted £18 in 12 instalments.—Widow, aged 63, of L.R.C.S. Edin., who practised on the West Coast of Africa and died in 1917. Was left unprovided for, and has recently had an operation for gall-stones and gastric ulcer. Has three children, all absent and unable to help. Relieved five times, £60. Voted £12 in 12 instalments.—Daughter, aged 64, of M.R.C.S. Eng. who practised in London and Watford and died in 1879. Applicant was left unprovided for, and owing to ill-health unable to do much work. Only income a pension from another charity. Relieved 10 times, £117. Voted £9 in 12 instalments.

Subscriptions may be sent to Dr. Samuel West, honorary treasurer, at 11, Chandos-street, Cavendish-square, London, W.

**THE ASSOCIATION OF INFANT WELFARE: A DEPUTATION TO LORD RHONDDA.**—A deputation from the Association of Infant Welfare and Maternity Centres has approached the President of the Local Government Board in regard to State help for the adequate feeding of mothers and young children, urging the extension of the present Government grant of 50 per cent. of the approved expenditure of welfare centres to cover the cost of supplying milk to children under school age and nourishment for nursing and expectant mothers in necessitous cases. Dr. Eric Pritchard pointed out the difficulty

for mothers under present circumstances of providing the necessary 1½ pints of milk per day for artificially fed babies, and the still greater difficulty in affording as much milk as was really needed for children from 9 months to 3 years, if they were to grow up sound and strong. He stated that a small quantity of sugar, now difficult to obtain, was vitally necessary for children under 18 months of age. Dr. Flora Shepherd stated that, in her experience, the provision at welfare centres of suitable meals for mothers largely increased the proportion of breast-fed babies. Lord Rhondda, in a sympathetic reply, foreshadowed early legislation to increase the powers of local authorities in the direction indicated.

MANCHESTER and district have contributed £47,000 in aid of the fund for the relief of blinded sailors and soldiers.

DUBLIN UNIVERSITY PARLIAMENTARY ELECTION.—The polling in this election began on Jan. 30th and closed on the afternoon of Feb. 5th. The net number of votes polled was: For Mr. A. W. Samuels, 1487; and for Sir Robert Woods, 679. Sir Robert Woods's supporters are satisfied at the result of the contest, as their candidate had only been before the constituency a few weeks. Sir Robert Woods has declared his intention of presenting himself as a candidate at the first vacancy which may occur in the representation of the University in Parliament.

## Appointments.

*Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

BRAMWELL, EDWIN, M.B. Edin., F.R.C.P. Lond. and Edin., has been appointed one of the Medical Referees under the Workmen's Compensation Act for the Sheriffdom of Fife.  
CUNNINGTON, C. WILLIETT, M.B., B.C. Camb., Acting Physician to Out-patients at Great Northern Central Hospital.  
GEORKE, R. J., M.D. Edin., Certifying Surgeon under the Factory and Workshop Acts for the Padstow District of the county of Devon.  
JACKSON, J. C., M.R.C.S., L.R.C.P. Lond., D.P.H., Deputy Medical Officer of Health for Hammersmith, *pro tem.*  
POOLER, H. W., M.B., B.Ch. Birm., Medical Officer to the Shirland District of the Chesterfield Union.  
VAN COLLIER, A. S., Senior Medical Student; Glasgow University, Assistant House Surgeon for General Infirmary, Greenock.  
WATSON, J. C., M.B. Edin., Certifying Surgeon under the Factory and Workshop Acts for the Lydbrook District of the county of Gloucester.  
WILSON, A. C., M.D. Glasg., Medical Officer to the Clay Cross District of Chesterfield Union.

## Vacancies.

*For further information regarding each vacancy reference should be made to the advertisement (see Index). When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.*

BARNES, BECKETT HOSPITAL AND DISPENSARY.—House Surgeon, Salary £200 per annum, with board, &c.  
BATH, EASTON DISPENSARY.—Resident Medical Officer. Salary £140 per annum, with furnished rooms, &c.  
BIRKENHEAD UNION INFIRMARY.—Junior Female Resident Assistant Medical Officer. Salary at rate of £300 per annum, with board, &c.  
BOLTON INFIRMARY AND DISPENSARY.—Senior House Surgeon, Second House Surgeon, and also Third House Surgeon. Salaries £230, £200, and £180 per annum respectively, with board, &c.  
BRISTOL GENERAL HOSPITAL.—House Surgeon for six months. Salary at rate of £275 per annum, with board, &c.  
CARDIFF, KING EDWARD VII'S HOSPITAL.—House Surgeon for six months.  
CHARING CROSS HOSPITAL, Agar-street, W.C.—House Physician and House Surgeon. Salary £100 per annum, with board, &c.  
DERBYSHIRE ROYAL INFIRMARY, DERBY.—House Physician and Casualty Officer. Also Resident Anaesthetist. Salaries £200 per annum, with board, &c.  
DUMFRIES, CHICHTON ROYAL.—Temporary Pathologist and Clinical Pathologist, unmarried. Salary £300 per annum, with board, &c.  
EDINBURGH PARISH COUNCIL, CRAIGLOCKHART POORHOUSE AND HOSPITAL.—Assistant Medical Officer. Salary £250 per annum, with board, &c.  
GUILLIFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon. Salary £200 per annum, with board, &c.  
KENT EDUCATION COMMITTEE.—Temporary School Medical Inspector and Medical Officer of School Clinic. Salary at rate of £350 per annum.  
MAIDSTONE, WEST KENT GENERAL HOSPITAL.—Senior House Surgeon. Salary £250 to £300 per annum.  
MANCHESTER, BAGULEY SANATORIUM FOR TUBERCULOSIS.—First Assistant Medical Officer, unmarried. Salary £300 per annum, with board, &c.  
MANCHESTER COUNTY ASYLUM, Prestwich.—Locum Tenens. Salary £7 7s. per week, with board, &c.  
MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Park-place, Cheetham Hill-road.—Female House Surgeon. Salary £120 per annum, with board, &c.

MANCHESTER ROYAL INFIRMARY.—Resident Medical Officer. Salary £225 per annum, with board, &c.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, Bloomsbury.—Junior House Physician. Salary £150 per annum, with board, &c. Also Female Co-examiner to School of Massage.

NEWPORT COUNTY BOROUGH.—Medical Officer for Maternity and Child Welfare Scheme. Salary £350 per annum.

NORTHERN HOSPITAL, Winchmore Hill, N.—Tuberculosis Wards: Resident Temporary Assistant Medical Officer. Salary 7 guineas per week.

NOTTINGHAM AND MIDLAND EYE INFIRMARY.—Female Resident House Surgeon. Salary £120 per annum.

PARISH OF ST. GILES' CAMBRKWELL, INFIRMARY, Brunswick-quare, Camberwell.—Two Locum Tenens Assistant Medical Officers. Salary £7 7s. weekly, each with board, &c.

QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green.—Temporary Assistant Physician to Out-patients.

ROTHERHAM HOSPITAL.—Junior House Surgeon. Salary £150 per annum, with board, &c.

ST. MARK'S HOSPITAL, City-road, E.C.—House Surgeon. Salary as arranged, with board, &c.

ST. PETER'S HOSPITAL FOR STONE, &c., Henrietta-street, Covent Garden, W.C.—Junior House Surgeon for six months. Salary at rate of £75 per annum, with board, &c.

SAFEGARD ROYAL HOSPITAL.—House Surgeon and Junior House Surgeon. Salaries at rate of £200 and £150 per annum respectively, with board, &c.

STAFFORDSHIRE EDUCATION COMMITTEE.—Female Assistant School Medical Inspectors. Salaries at rate of £400 per annum.

SUNDERLAND ROYAL INFIRMARY.—Female House Surgeon. Salary £150 per annum, with board, &c.

UNIVERSITY OF LONDON.—External Examiners.

## Births, Marriages, and Deaths.

### BIRTHS.

ARCHER.—On Jan. 23rd, to Ada Caroline, the wife of Charles W. Archer, F.R.C.S., Temp. Surgeon, R.N.—twin daughters.

FENN.—On Feb. 2nd, at Lancaster-place, Hampstead, N.W., the wife of Captain C. E. Fenn, R.A.M.C., of a daughter.

HUDSON.—On Jan. 29th, at the Flore de Nightingale Home, to Major and Mrs. Bernard Hudson, R.A.M.C., of Davos-Platz, Switzerland—twin sons.

JAMES.—On Jan. 29th, at Rose-lane, Llanon, Aberystwith, the wife of Captain Gwilym James, R.A.M.C., of a daughter.

LAMGRISHE.—On Feb. 3rd, at The Park, Beckenham, Kent, the wife of Captain (temporary Lieutenant-Colonel) J. du Plessis Lamgrishe, R.A.M.C., of a son.

MYER.—On Feb. 6th, at Cambridge-terrace, Hyde Park, the wife of Leonard Myer, F.R.C.S., of a daughter.

PINCHING.—On Feb. 4th, at Framp-on-on-Severn, Stonehouse, Glos., the wife of W. G. Pinching, M.R.C.S., L.R.C.P., of a son.

POOLEY.—On Feb. 3d, at Highfields, Chew Magna, Somerset, to K. Priscilla (née Bright), wife of Captain John Sandy Pooley, R.A.M.C., S.R.—a son.

Pritchard.—On Jan. 29th, at West Side, Wandsworth Common, the wife of Edward J. Pritchard, M.R.C.S., L.R.C.P. Lond.—a son.

SMITH.—On Jan. 27th, at M'ville-street, Edinburgh, the wife of Captain A. Nimmo Smith, R.A.M.C., of a son.

### MARRIAGES.

COURTENAY—ASHWORTH.—On Feb. 3d, at St. Paul's Church, Onslow-square, S.W., by the Rev. Peb Webb-Peploe, assisted by the Rev. A. C. Ashworth, brother of the bride. Ashley Reginald (Lieutenant, A.S.C.), elder son of the Rev. and Mrs. C. C. Courtney, Rome, Italy, and Edith Kennedy, younger daughter of J. Henry Ashworth, M.D. St. And., M.R.C.S. Edin., of Vigne House, Cliftonville, Kent.

ELTON—MAULE.—On Jan. 30th, at St. Mary's Church, Huntingdon, Henry B. Elton, M.B., to Mary Constance (Molly), younger daughter of Mr. and Mrs. J. Percy Maule, The Views, Huntingdon.

LEWERS—ASHWORTH.—On Feb. 3d, at St. Paul's Church, Onslow-square, S.W., by the Rev. Peb Webb-Peploe, assisted by the Rev. A. C. Ashworth, brother of the bride. William Hartley Nicholson, elder son of Arthur H. N. Lewers, M.D. Lond., F.R.C.P., of 15, Southwick-street, W., and Winifred Louise, elder daughter of J. Henry Ashworth, M.D. St. And., M.R.C.S. Edin., of Vigne House, Cliftonville, Kent.

MUIRHEAD—HALL.—By special licence, at St. Andrew's Church, Sharrow, Sheffield, by the Rev. C. Non Allen, on Jan. 20th, William Martin Muirhead, temporary Captain, R.A.M.C., son of Mr. and Mrs. Hugh Muirhead, Fulwood, Sheffield, to Gladys, young st daughter of the late William E. Hall and of Mrs. Hall, Sharrow, Sheffield.

RAWSON—FURNIVAL.—On Feb. 1st, at Metheringham, Captain P. H. Rawson, R.A.M.C., M.C., S. S. affe., to Mary Elizabeth, second daughter of Mr. R. B. Furnival, The Mead, Handforth, Cheshire.

### DEATHS.

BRUCE.—On Feb. 3rd, suddenly, in London, Robert Bruce, J.P., M.R.C.S., of Hillyfield, Millerton-Sea, Hants, aged 63 years.

HARDEY.—On Jan. 31st, at Spring-bank, Hull, Edward Pelroe Hardey, M.R.C.S., L.R.C.P., aged 70 years.

OLIVER.—On Feb. 1st, at his residence, Parkfield-road, Liverpool, John Brown Oliver, M.D., M.R.C.S., L.S.A., in his 82nd year.

PROWSE.—On Feb. 5th, at Saville-place, Clifton, Bristol, William Prowse, M.R.C.S., in his 92nd year.

ROCK.—Lost by the sinking of H.M.S. Laurentic, on Jan. 25th, Frank Ernest Rock, M.D. Lond., D.P.H., Surgeon, R.N.

SHILLINGFORD.—On Jan. 31st, Frank Norton Shillingford, M.R.C.S. Eng., Wisteria-road, Lee, S.E., aged 57 years.

N.B.—A fee of 6s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

## Notes, Short Comments, and Answers to Correspondents.

### THE CONSERVATIVE TREATMENT OF BURNS AND SCALDS.

To the Editor of THE LANCET.

SIR.—Dr. G. J. O'Reilly's communication in your issue of Jan. 27th gives food for reflection, especially in regard to aseptic scalds and burns. The torture endured by the victims, on which he lays emphasis, must undoubtedly add greatly to the shock of the injury and contribute to the delay or prevention of recovery. Perhaps I may be allowed to relate an experience of my own bearing on the subject.

Some years ago, as the result of an accident, about two gallons of boiling water fell on my bare right foot. The rapidly ensuing pain was in the highest degree unbearable, and I instinctively plunged the foot into a washing-basin half full of water in which a breakfast-cupful of bath salt had been dissolved overnight, to which I added a dessert-spoonful of bicarbonate of soda. I immediately felt relief, but I thought it right to send out as soon as possible for camomile oil and the usual dressings, including cotton-wool. In about a minute from their application the pain had returned in all intensity. I then had a foot-bath prepared containing common salt and bicarbonate of soda, in about the proportions indicated, at a temperature of 90° F. The effect was as if the foot had been immersed in liquid fire, but as soon as the temperature was reduced to 80° F. I was completely at ease. Meanwhile, unknown to me, the late Mr. John Langton had been summoned. I well remember the puzzled expression his face wore when, armed with morphia and syringe, he entered the room to find me heartily partaking of breakfast and reading the morning paper. He punctured a bulla extending over the dorsal aspect of the foot and toes and subsidiary ones about the ankles; and returned at 11 P.M. similarly provided to find me in bed in perfect comfort. Pressed to define the sensation in my foot, I explained that it had the character of a nettle-sting, but was much less severe. Indeed, it was scarcely noticeable. After an excellent night I resumed the foot-bath, maintaining a temperature of from 70° to 80° F. up to the afternoon of the third day, when I drove out, wearing a slipper, and for two hours visited patients, going up and down several flights of stairs. The result was rapid filling of the bullae, the appearance of a zone of redness at their margins, and a modern return of pain. I resumed the treatment until the morning of the fifth day, on which I returned to work and went about as usual with impunity. Desquamation went on for six weeks.

Since then I have both carried out and recommended the treatment described with uniform success. The most recent case was that of a scald of the hand from the wrist to the finger-tips. The patient was persuaded in the first instance to carry out the more orthodox treatment and passed the night in great pain. On the following morning the hand was bullous from wrist to finger-tips, of an angry red colour, and the fingers were in shape like large sausages and immovable. The saline bath at 80° F. or a little less was then adopted. The relief of pain was immediate, and by the afternoon the swelling had so far subsided that the fingers were freely movable. A rapid recovery ensued. Both the cases cited were scalds of the second degree.

It is within my memory that an Austrian archduchess set fire to her dress while holding a cigarette behind her. She was fearfully burned over the greater part of her body, and she was immersed in a bath to facilitate removal of portions of her clothing and the cleansing of her wounds. Every time that an attempt was made to remove her to a bed the pains became unbearable, and the unfortunate princess remained immersed until she succumbed to shock on the third day.

I am, Sir, yours faithfully,

W. BEZLY THORNE.

#### EDIBLE SEAWEED.

INTEREST seems to be reviving in many old-fashioned forms of food, promoted, no doubt, by the increased activity of the German submarines. Laver-bread has received popular attention lately. It is a sort of food made from green-laver (*Ulva latissima*), sometimes called "oyster-green" from being frequently attached to oysters. Other names for it are "sea-lettuce" or "marine sauce." It has a broad, flat membranaceous frond of a brilliant green, and throws itself into folds and puckers with the movement of the water. It has been used in Scotland, where it is called the "green sloke," not only for food but as a sort of water-dressing bound round the temples, and is considered efficacious as a remedy for headache, after the fashion of fresh cucumber-peel applied to the forehead.

There is another variety called the *Porphyra laciniata*, or the "purple laver," which is said to have a better flavour Hooker, writing in 1833, says:—

This, under the name of Laver, is much eaten in many places, especially the south of England, pickled with salt and preserved in jars, and when brought to table, served up with lemon juice. According to Lightfoot, the inhabitants of the Western Islands gather it in the month of March and after pounding and macerating it with a little water, eat it with pepper, vinegar and butter. Others stew it with leeks and onions.

Pavy, writing in 1875, said that—

Dr. Letheby urges the advisability of extending the use of so valuable and abundant a stock of food which already enters largely into the diet of some of the coast inhabitants of Great Britain, Ireland, and the Continent. Before being cooked they require to be soaked in water, to remove their saline matter. They are then stewed in water or milk until they become tender and mucilaginous. Sometimes they are pickled and eaten with pepper, vinegar and oil or with lemon juice. The consumption of laver is thought to be useful in scrofulous affections and glandular tumours.

Another edible seaweed which is well known is "Irish moss" or "Carragheen" (*Chondrus crispus*), used in chronic bronchial affections and in diarrhoea, dysentery, and renal disorders. It has also been used for making soup, a kind of blancmange, and size. Some other seaweeds are said to reduce corpulence. The Japanese and Chinese have used edible seaweed for a long time as food in the shape of sweetmeats, and even as biscuits or bread. Many years ago specimens of these were brought to London and put on exhibition. They certainly looked appetising enough. Another food obtained from the edges of the sea is samphire (a corruption of Saint Pierre), which is likewise pickled and eaten with vinegar. The green tubular stalks are sucked or drawn off a central, fibrous, thread-like stem.

#### HOW TO RATION THE HOUSEHOLD.

THE National Food Reform Association has issued three pamphlets in series, entitled "Facts for Patriots" (3d. each), from the office of the association, 178, St. Stephen's House, Westminster. These pamphlets have already helped many to revise and reduce their food expenditure, and it is believed that the changes have been effected with profit rather than prejudice to the health of the households. Dealing with the economical use of meat, fish, meat substitutes, the proper place in the dietary of bread and flour, sugar and sweets, milk, vegetables, fruit, and salads, they supply useful information for the moment. Copies, with recipes, may be obtained, post-free, by forwarding 1s. 3d. to the honorary secretary.

Supplementary and more scientific information will be found in Professor Bayliss's book on the "Physiology of Food and Economy in Diet," which Messrs. Longmans will shortly publish. It deals with such subjects as the uses of food, the quantity required, digestibility, vegetarianism, and other problems which are of importance not only in war-time but in times of peace. No previous knowledge of physiology is assumed. The same firm have in the press a new edition of "One Hundred and One Practical Non-Flesh Recipes," by Margaret Blatch, late principal of the Eustace Miles School of Cookery. It is hoped that the amateur cook will be able to work from these recipes as easily as the professional.

#### SWAZILAND.

THE Swaziland Protectorate (called by the natives Kwa-Ngwanne) lies between the Drakensberg and Lebombo Mountains in British South Africa. The Transvaal Province forms a boundary on the south, west, and north, the eastern boundary being Zululand and the Portuguese province of Mozambique (Delagoa Bay). The country was formerly under the administration of, but not incorporated with, the South African Republic; it is now controlled by the British Government. The total area is 6536 square miles, and the population, according to a census taken in 1911, amounts to 99,959, of whom 1083 are Europeans, the bulk of the remainder being natives—Ama-Swazi Bantus (or Swazis). According to the Blue Book for 1915 the general health of the community during the year was good. There has been no serious epidemic of any kind. As the result of a dry season there was less malaria than usual. There are sporadic cases of enteric each year, but as a rule this disease runs a mild course. There are a few cases of leprosy amongst the native population and these are isolated as far as possible. Births and deaths of natives are not registered. Amongst Europeans the births during the year numbered 42, or approximately 35 per 1,000, and the deaths 12, or approximately 10 per 1000. The only hospital is at Mbabane. To this 83 patients were admitted, of whom 6, including 2 Europeans died; there were 1920 out-patients. The uneducated native makes but little use of the services of the Government medical officers, which services are provided free in most cases; he prefers to be treated by his own medicine man. In the malarial districts, however, the beneficial effects of quinine, which is distributed free by the Government, are being appreciated by the natives.

## Medical Diary for the ensuing Week.

### SOCIETIES.

**ROYAL SOCIETY,** Burlington House, London, W.

**THURSDAY.**—Papers:—Dr. J. H. Mummery: On the Structure and Development of the Tubular Channel of the Sparids and Labridae (communicated by Prof. J. Symington).—Miss H. Chick and Miss E. M. M. Hume: The Distribution in Wheat, Rice, and Maize Grains of the Substance, the Deficiency of which in a Diet causes Polyneuritis in Birds and Beri-beri in Man (communicated by Dr. C. J. Martin).—Miss H. Chick and Miss E. M. Hume: The Effect of Exposure to Temperature at or above 100° C. upon the Substance (Vitamine) whose Deficiency in a Diet causes Polyneuritis in Birds and Beri-beri in Man (communicated by Dr. C. J. Martin).

**ROYAL SOCIETY OF MEDICINE,** 1, Wimpole-street, W.  
MEETINGS OF SECTIONS.

Tuesday, Feb. 13th.

**PATHOLOGY** (Hon. Secretaries—Gordon W. Goodhart, C. Price-Jones): at 5 P.M.

**Papers:**  
Major F. W. Mott, R.A.M.C., F.R.S.: (1) Changes in the Central Nervous System in Cases of Hypothyroidism; (2) Changes in the Central Nervous System in Cases of Shell Shock and Gas Poisoning.

Dr. Drinkwater: An Anatomical Abnormality inherited from the Fifteenth Century.

Thursday, Feb. 15th.

**DERMATOLOGY** (Hon. Secretaries—J. H. E. McDonagh, Henry MacCormac): at 5 P.M.

Dr. Graham Little: A Case of "Erythème Annulaire Centrifuge" (Darier).

Dr. J. M. H. MacLennan (for Dr. Allworthy): Photographs of a Form of Occupation Dermatitis occurring in the Flax-spinning Mills of Belfast and known as "Doffer's" Eruption.

Friday, Feb. 16th.

**OTOLOGY** (Hon. Secretaries—E. D. D. Davis, Somerville Hastings): at 8.15 P.M.

**Special Discussion:**

On "War Injuries and Neuroses of Otological Interest." To be opened by Mr. H. J. Marriage, F.R.C.S., President of the Section.

**NEUROLOGY.**—Members of the Section of Neurology are specially invited to attend the meeting of the above Section.

**ELECTRO-THERAPEUTICS** (Hon. Secretaries—E. P. Cumberbatch, Robert Knox): at 8.30 P.M.

**Paper:**

Dr. Martin Berry: Trauma in the Etiology of Arthritis.

**MEDICAL SOCIETY OF LONDON,** 11, Chandos-street, Cavendish-square, W.

**MONDAY.**—8.30 P.M., Paper:—Surg.-Gen. H. D. Rolleston, R.N., C.B.: Naval Medicine in the Great War.

**HUNTERIAN SOCIETY** at the Royal Society of Medicine, 1, Wimpole-street, W.

**WEDNESDAY.**—6.30 P.M., Council Meeting. 9 P.M., Hunterian Society Oration:—Dr. Langdon Brown: The Hunterian Tradition in Cardiac Research.

**ROYAL SOCIETY OF ARTS,** John-street, Adelphi, W.C.

**MONDAY.**—4.30 P.M., Cantor Lecture:—Prof. A. B. Pite: Town Planning and Civic Architecture. (Lecture III.)

**WEDNESDAY.**—4.30 P.M., Mr. L. Chubb: Highways and Footpaths.

**MEDICO-PSYCHOLOGICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND,** 11, Chandos street, Cavendish-square, W.

**THURSDAY.**—3 P.M., General Meeting. Paper:—Dr. R. Armstrong Jones: Dreams and their Interpretation, with Reference to Freudism.

**SOCIETY OF TROPICAL MEDICINE AND HYGIENE,** 11, Chandos-street, Cavendish-square, W.

**FRIDAY.**—5.30 P.M., Paper:—Miss H. Chick and Miss E. M. M. Hume: The Distribution among Foodstuffs (especially those suitable for the rationing of Armies) of the Substances required for the Prevention of (a) Beri-beri and (b) Scurvy.

### LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

**ROYAL COLLEGE OF SURGEONS OF ENGLAND,** Lincoln's Inn Fields, W.C.

**MONDAY.**—5 P.M., Hunterian Lecture:—Prof. J. Hutchinson: On Dupuytren's Contracture. Dupuytren's Life and Surgical Works.

**WEDNESDAY.**—5 P.M., Hunterian Oration:—Sir George H. Makins, K.C.M.G., C.B.: Hunter's Influence on Military Surgery.

**POST-GRADUATE COLLEGE,** West London Hospital, Hammerton-street, W.

**MONDAY.**—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

**TUESDAY.**—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

**WEDNESDAY.**—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pernet: Operations.

**THURSDAY.**—2 P.M., Medical and surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

**FRIDAY.**—10 A.M., Dr. Simson: Gynaecological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

**SATURDAY.**—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pernet: Operations.

**ROYAL INSTITUTE OF PUBLIC HEALTH,** Lecture Hall of the Institute, 37, Russell-sq., W.C.

Courses of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—

**WEDNESDAY.**—4 P.M., Lecture V.:—Lieut.-Col. S. A. M. Copeman, M.D.: The Prevention and Arrest of Infectious Disease in War Time. Lieut.-Col. D. Harvey, R.A.M.C., has promised to take part in the discussion.

**ROYAL INSTITUTION OF GREAT BRITAIN,** Albemarle-street, Piccadilly, W.

**TUESDAY.**—3 P.M., Prof. C. S. Sherrington: Pain and its Nervous Basis. (Lecture V.)

### EDITORIAL NOTICES.

It is most important that communications relating to the Editorial business of THE LANCET should be addressed exclusively "To the EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET should be addressed "To the Manager."

We cannot undertake to return MSS. not used.

Offices: 423, STRAND, LONDON, W.C.

### MANAGER'S NOTICES.

#### VOLUMES AND CASES.

VOLUMES for the second half of the year 1916 will be ready shortly. Bound in cloth, gilt lettered, price 16s., carriage extra.

Cases for binding the half-year's numbers (inland edition) are now ready. Cloth, gilt lettered, price 2s., by post 2s. 4d.

To be obtained on application to the Manager, accompanied by remittance.

#### ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the new year, the price was raised to 8d. The rates of subscription remain as revised in October.

#### TO COLONIAL AND FOREIGN SUBSCRIBERS.

Subscribers abroad are particularly requested to note the rates of subscriptions given on page 4.

The Manager will be pleased to forward copies direct from the Offices to places abroad at the rates shown, whatever be the weight of any of the copies so supplied.

#### METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Feb. 7th, 1917.

Date.	Rain-fall.	Solar Radio in Vacuo.	Maxi-mum Temp. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Remarks.
Feb. 1	...	45	34	32	33	34	Overcast
" 2	...	30	30	28	29	29	Overcast
" 3	...	40	37	27	28	28	Overcast
" 4	...	42	37	24	24	24	Fine
" 5	0.19	50	34	24	24	24	Overcast
" 6	...	59	36	24	27	27	Cloudy
" 7	...	50	35	22	24	24	Cloudy

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

The following journals, magazines, &c., have been received:—

Practitioner, La Clinique Ophtalmologique, Indian Medical Gazette, British Dental Journal, Edinburgh Medical Journal, British Journal of Dental Sciences, Transactions of the Society of Tropical Medicine and Hygiene, St. Paul Medical Journal, Annales d'Igiene, Journal of Nervous and Mental Disease, Archives de Médecine et de Pharmacologie Militaires.

## BOOKS, ETC., RECEIVED.

- CHESTERHILL, J. AND A.**, London. Short Practice of Gynaecology for Medical Students. By H. Jellett, M.D. Dub., F.R.C.P.I. 16s. net.  
**WRIGHT, JOHN**, Bristol. Ligations and Amputations. By Professor A. Broca (Paris). Translated by Ernest Ward, M.A., M.D., F.R.C.S. 8s. 6d. net

- LIPPINCOTT CO.**, J. B., London, Philadelphia, and Montreal. Syphilis and the Nervous System. By Dr. Max Nonne. Authorised Translation from Second German edition. By C. E. Ball, B.A., M.D. Second American edition, revised. 18s. net.  
 Pharmacology and Therapeutics. By Horatio C. Wood, jun., M.D. Second edition. 18s. net.  
 Applied Immunology. By B. A. Thomas, A.M., M.D., and R. H. Ivy, M.D., D.D.S. Second edition, revised. 16s. net.  
 Applied Anatomy. By Gwilym G. Davis. Fourth edition. 24s. net.

## Communications, Letters, &amp;c., have been received from—

- A.**—Prof. F. W. Andrews, Lond.; Messrs. Arnold and Sons, Lond.; Association of Infant Welfare and Maternity Centres, Lond.; Australian Red Cross Society, Lond.; Aymard Patent Milk Sterilizer Co., Ipswich; American Public Health Association, Boston; Messrs. Adlard and Son, and West and Newman, Lond.  
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## The Hunterian Oration

ON THE

### INFLUENCE EXERTED BY THE MILITARY EXPERIENCE OF JOHN HUNTER ON HIMSELF AND THE MILITARY SURGEON OF TO-DAY.

*Delivered before the Royal College of Surgeons of England on Feb. 14th, 1917,*

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**MR. PRESIDENT AND GENTLEMEN.**—This day 189 years ago witnessed the birth of John Hunter. Since the year 1814 it has been customary for a member of the Council of this College to deliver at stated intervals an address recalling the memory of that illustrious man. The speakers on these occasions have in turns devoted the short space of time at their disposal to either a philosophical disquisition, an attempt to form an estimate of the influence exerted by Hunter on the surgical thought of his time, or to dwell upon some portion of the writings he has left us. My own powers are unequal to the first task, while my knowledge of the state of surgery as Hunter found it is too limited to allow me to essay the second. I therefore propose to deal briefly with his work as a military surgeon, and to try to show what influence this may have had on his successors and upon himself, and how far the views which he held and taught deviate from those which guide the military surgeon of to-day.

I think the divergence is not a very wide one, for although some of the most modern surgical practice has been spoken of as a *revolution*, yet the general tendency has rather been in the direction of a *reaction*. I believe that this reactionary character has been as striking in the surgery practised during the present war as it has been in the military methods employed. I may instance the return to the direct transfusion of blood, the performance of excision of joints in the early stage of acute arthritis, the extensive operations for head injuries, and the character of the methods of wound treatment advocated by some; even in the case of the chief triumph of recent military surgery, operations for injury of the hollow abdominal viscera, the advance has depended rather on the favourable conditions furnished by the nature of the warfare than on any change in surgical principles.

#### HUNTER AS MILITARY SURGEON.

Of John Hunter's actual life and doings in the field we know little. In the year 1760 he went as surgeon on the staff to Belleisle and Portugal, his term of active service amounting to two years, while in 1790 he was appointed Inspector-General of Hospitals and Surgeon-General of the Army. It is, perhaps, not astonishing to find that not a small share of the meagre correspondence at our disposal is devoted to matters regarding promotion, pay, the character of his seniors, and the social qualities of his colleagues. The world and military life have, no doubt, altered but little in these respects.

With the exception of his own writings, nothing remains of the surgical history of the wars in which he took part. This is to be explained by the fact that the wounded men were transferred on board ship as quickly as possible and sent to England. Hence Hunter, as is the case with his successors of to-day, was afforded but small opportunity of following out the complete history of the majority of the patients who may have come under his care. His own brief mention of his work is characteristic enough; he says in one of his letters<sup>1</sup>:—

"Thank God I have succeeded in everything I have attempted, but my practice in gunshot wounds has been in a great measure different from all other, so that I have had the eyes of all the surgeons upon me, both on account of my supposed knowledge and method of treatment."

How far Hunter's immediate colleagues agreed with his opinions and practice it is impossible to tell, but that his influence at a later date was great is evident from the comments of the next great military authority belonging to our own College. Mr. Guthrie says<sup>2</sup>:

"Hunter served for a few weeks in 1761 at the siege of Belleisle, and it is much to be regretted that his opportunities were not sufficiently numerous to enable him to draw such inferences from them as would have left but little to desire. The greater part of what he did leave was from this cause found not to accord with the observations made by his successors, while the prestige attached to his name was so great, as much to impede their progress on many essential points."

An examination of Guthrie's writings does not, however, appear to afford much support to this statement, except in so far as Hunter's disinclination to perform either primary or intermediate amputations is concerned. We shall perhaps do better therefore to examine shortly for ourselves the material which Hunter left behind him, and judge how far his opinion and teaching differ from those of to-day. While, however, confining ourselves for the most part to the two lectures especially devoted to "The Treatment of Gunshot Wounds," we must bear in mind that Hunter states that his "extensive opportunities of attending to gunshot wounds" drew his attention to the subject of "inflammation in general" and enabled him to make observations which formed the basis for his "Treatise on the Blood and Inflammation."

#### HUNTER'S WRITINGS ON GUNSHOT WOUNDS.

The two lectures on "The Treatment of Gunshot Wounds" differ considerably in character from the series devoted to general surgery. They are more simple and direct, less overlaid by theory, and consist for the most part of clinical observations and practical instructions. Perusal of them furnishes some support to Guthrie's criticism, in that the illustration of some of the statements made is found in descriptions of cases met with at a later date in civil practice. An equally satisfactory explanation of this occurrence is, however, offered by the fact that for these lectures, as in all Hunter's writings, the material on which they are based was collected many years before the time at which it was utilised for publication.

In the second lecture devoted to gunshot injuries of the special regions of the body little is included which is not equally applicable to the subject to-day. In dealing with the subject of injuries to the head Hunter belonged to the active school—any injury appeared sufficient excuse for trepanning the skull. He dwells on the necessity of raising a sufficiently extensive flap to allow of proper exploration of injury to the skull, and speaks of the propriety of incising the dura mater in some instances. With regard to the latter procedure, however, he says: "Whenever I have seen the dura mater opened, the brain has worked through the opening, and the patients have died" (i., 495); hence he recommends caution.

The favourable prognosis attendant upon wounds of the chest is recognised, also the importance of collapse of the wounded lung in restraining primary haemorrhage and the tendency of the blood effused into the pleural cavity to clot (iii., 353). Hunter made a number of experiments on the production of pneumothorax, &c., on dogs, and recommends "the operation for the Empyæma" in cases of haemothorax. It does not appear, however, whether he ever performed this operation.

In the section on injuries to the abdomen the expectant method of treatment is imposed, and this perhaps especially because Hunter was familiar with the favourable course which followed the formation of a secondary faecal abscess and fistula when the colon has been injured. In the matter of diagnosis no great advance has been made since his time, except that dependent on the use of the X rays in localising the seat of foreign bodies. The value of localised pain and tenderness as a diagnostic aid is dwelt upon, also the various haemorrhages as signs indicative of injury to special viscera. Again, it is interesting to notice that he dwells upon the absence of any certain sign denoting injury to the spleen, also the fact that either the spleen or spleen and liver may be wounded without any obvious adverse result. The often re-discovered fact that there is little tendency for the contents to escape from a wound of

<sup>1</sup> S. Paget: Life of John Hunter, p. 75.  
NO. 4877.

<sup>2</sup> Guthrie: Commentaries on Surgery, p. 5.  
G

small intestine was also impressed by Hunter. In view of the modern treatment of septic peritonitis it is instructive to note that the suggestion is made of placing the patient in a tepid bath in order to supply fluid to the general constitution. Directions for treatment consist, however, mainly in instruction of how to deal with the secondary consequences of injuries to the abdominal viscera; as to primary lesions he says: "I should suppose the very best practice would be to be quiet and do nothing, except bleeding, which in cases of wounded intestine is seldom necessary."

Conservatism is impressed in the matter of primary removal of bone fragments in gunshot fractures and the too early interference with sequestra. Hunter, in fact, takes the same line in dealing with these, as he lays down in the case of retained missiles. "In general there can be no better way of coming to a part or extraneous body than by waiting for the formation of an abscess there."

The one point on which Hunter's immediate successors appear to differ most freely from him, is as to the line to be followed when an amputation has to be considered. He says, "I have already observed that few can support the consequences of the loss of a lower extremity when in full health and vigour"; hence he avoided primary amputation whenever possible, condemned operations of an intermediate nature, and preferred those of the secondary class.

We may now pass on to the question of the treatment of gunshot wounds in general, dealt with in the first lecture and throughout the whole "Treatise on the Blood and Inflammation."

#### WOUND TREATMENT.

Hunter's methods of treatment were guided by the views held by him on the pathology of the healing of wounds, and these methods were limited in consequence of his ignorance of the part played by infection as a cause of inflammation. Hence he is not concerned to differentiate between the process of repair and that of inflammation. He says:—

"The injury done has in all cases a tendency to produce both the disposition and the means of cure. The stimulus of imperfection taking place immediately calls forth the action of restoration" (iii., 239), yet "injuries often excite more action than is required" (iii., 260). Then inflammation is excessive, and this "may arise from a vast variety of causes with which we are at present unacquainted; may, which we do not perhaps even suspect" (iii., 407).

While he regarded suppuration as an unavoidable consequence of many wounds, yet he says "suppuration may be considered a resolution, but it is the mode of resolution we commonly wish to avoid" (iii., 369). Hence his attempts to diminish the degree of general reaction by blood-letting, and locally to effect an immediate closure of the wound. "In parts which have been divided and exposed the inflammation is in great measure prevented by bringing them together" (iii., 369), and when this cannot be done, "Nature attempts to prevent inflammation by covering the wound with blood and forming an eschar." Thus a power of resolution is shown "even in cases where the parts have been exposed."

It is of interest in this relation to recall that he combats the opinion promulgated by A. Paré and held long after that exposure to the air was in itself a cause of suppuration. "Exposure to air certainly has not the least effect on parts exposed, for a stimulus would arise from a wound even were the part contained in a vacuum." Air takes no part in the formation of an abscess, cellular emphysema is not attended by suppuration, the air itself in a pneumothorax is not a source of danger, nor is air necessary for the development of a gonorrhoea.

In describing the special characteristics of gunshot wounds, contusion is the feature upon which he lays most stress (iii., 545). He observes that the degree and extent of the contusion vary inversely with the velocity retained by the missile. Thus, the greater the velocity retained by the ball, the cleaner it wounds the parts, yet they slough; if the velocity is low the mischief is less and the ball more easily deflected. If the velocity be high, blood-vessels are divided instead of being contused; if it be very low they are torn.

The contusion of the tissues and the resulting slough prevent healing by the "first intention," "from which circumstance most of them must be allowed to suppurate" (iii., 543). Hunter observed that the tissue devitalised by contusion temporarily protected that lying beneath, and hence the advent of inflammation (infection) was retarded, an observation which still retains its force in the case of more modern projectiles. Hunter deprecates the practice handed

down from A. Paré and Wiseman of routine enlargement of gunshot wounds, and ascribes its origin to anxiety on the part of the surgeon to remove a foreign body. He then points out the difficulty often accompanying the attempt to extract foreign bodies, the fact that experience had shown that these might be left without evil consequences, and concludes that the custom of opening up wounds had been continued in ignorance of its primary object. He does not appear to have realised that the practice afforded an advantage not properly appreciated of affording drainage to an infected area.

Still, the rule "that it should not be opened up because it is a gunshot wound, but because there is something necessary to be done which cannot be executed unless the wound is enlarged" (iii., 549) is sound enough, as also the statement "this is common surgery and should be military surgery respecting gunshot wounds" (iii., 550), and is certainly to be preferred to that of Baron Percy enunciated so late as 1792, "the first indication is to change the nature of the wound as nearly as possible into an incised one."

Hunter, however, improperly undervalues the argument that enlargement of the wound takes off the tension arising from the inflammation because he considered inflammation a necessary consequence of gunshot wounds, and "any increase in the size of the wound was to be considered as an extension of the first mischief, and must be supposed to produce an increase of the effects arising from that mischief" (iii., 552).

He then proceeds to enumerate a number of conditions which call for enlargement of the wound which obviously hold good to-day; but "if none of these circumstances has happened I think we should be very quiet." Nevertheless, he recognised the danger of a contour wound and recommended an incision over the centre, or the laying open of the entire track, to avoid the danger of abscess formation and the occurrence of extensive suppuration—a danger not always appreciated as it should be in dealing with contour wounds of the head, chest, and abdomen even to-day.

#### LOCAL TREATMENT OF THE WOUND.

"The injury done has in all cases a tendency to produce both the disposition and the means of cure. The stimulus of imperfection taking place immediately calls forth the action of restoration" (iii., 239).

"The first and great requisite for the restoration of wounded parts is rest, as it allows that action which is necessary for repair to go on without interruption" (iii., 260).

In these two axioms we find the theory upon which Hunter's treatment of wounds was based. The dominating factor in the healing of the wound he held to be the vital process or action of the body, a principle dwelt upon in equal measure by his great successor Lister, and one to which, perhaps, too little attention is given even to-day by the originators and advocates of various local methods of wound treatment.

He drew little distinction between the process of repair and that of inflammation, regarding both as the consequences of an "operation" in which the blood-vessels took the major share, since in the state of knowledge then existing he was ignorant of the important part taken by increased activity of the fixed tissue element in addition. Again, his ignorance of the common dependence of inflammation on infection hampered him in devising any local form of application to the wound. Hence we find him mainly occupied with discussing the relative merits of a cold- or hot-water dressing and the advantages to be obtained by the use of the poultice which required to be less frequently reapplied, and could be removed more easily and with less pain to the patient.

Regarding the healing of a wound as a natural "vital operation" Hunter saw no greater mystery in this process than in the growth and development of the infant to the man. So to-day, in apportioning its relative value to any special form of wound treatment, we must bear in mind that it is difficult, aye, impossible, to prevent the healing of a wound, much as the process may be interrupted or distorted by extraneous causes.

#### WOUND TREATMENT IN THE PRESENT WAR.

During the past two years the local treatment of gunshot wounds has given rise to as lively and ardent discussion as that accompanying the introduction of the antiseptic principle by Lister during the earlier part of the last half-century. It appears as if the steady development of the "aseptic

principle" and its obvious success in civil practice had lulled the modern surgeon into a happy dream, from which he was suddenly awakened to the terrible spectacle of wounds infected in a proportion and to a degree to him almost incredible.

"As a ship which passeth over the waves of the water, which when it is gone, the trace thereof cannot be found, neither the pathway of the keel in the waves."

So, indeed, the experience of the pre-antiseptic surgeon seemed to have vanished and left no trace in the minds of men. This is perhaps the less remarkable in that the simple wounds inflicted by the bullet of small calibre in recent wars had proved themselves of little consequence in affording either a ready pathway for the entrance of infection or a fertile ground for its extension.

The antiseptic measures suited to meet the limited demands attendant on the practice of aseptic surgery, and in which trust was at first reposed, proved impotent when applied to the treatment of the severe and grossly infected wounds produced by the altered forms of missile employed in the present warfare. This disappointing experience was followed by a brief acute reaction in the direction of attempting an immediate and complete primary sterilisation of the wound by the application of powerful antiseptic media such as liquefied carbolic acid and strong solutions of mercurial salts.

It appears strange that attempts at complete primary sterilisation of the wounds should have found so much advocacy. No surgeon has ever succeeded in procuring immediate sterilisation of extensive infected areas of tissue by chemical media, and the striking statement made by Lister on this subject seemed to have been completely forgotten.

"If, for example, a pair of forceps is handed to the operator with the intervals between the teeth occupied by dry septic pus, and a portion of this dirt becomes detached and left in the wound, the evil cannot be corrected by any antiseptic wash that is now at our disposal or that the world is ever likely to see."<sup>3</sup>

This being Lister's view regarding the ill-effects liable to follow the detachment of a few particles of infective matter from the teeth of a forceps, we may readily assume what his opinion would have been as to the feasibility of complete primary sterilisation of gross infection dependent on the passage or impaction of fragments of shell and dirty clothing.

The complete failure of attempts at effective primary chemical sterilisation led to increased resort to mechanical cleaning of the wound by removal of devitalised and infected tissue by the knife and scissors, and to the employment of counter incisions for drainage, both to prevent extension of the infection and to effect a cure. These procedures have remained measures of primary importance whatever subsequent method of treatment may be adopted.

Bacteriological investigation of gunshot wounds during the process of healing has shown that whatever method of treatment may be adopted, a certain primary sequence of bacterial growth and development is maintained.

Examination of "smear" preparations taken during the first 12 hours reveals the presence of no organisms although cultures prove positive. This incubation stage is followed by the appearance first of micrococci and a highly varied flora of other organisms. These latter in a properly drained wound tend to die out rapidly, and in the course of five or six days micrococci alone may persist. This is the crucial period for the completion of sterilisation, and success depends on two factors: (a) the vitality of the natural process and (b) the efficiency of the method of treatment adopted.

As to the first factor, in a certain proportion of instances the vital powers will suffice, but in a considerable number either the primary reaction is deficient, the infection too gross to be efficiently dealt with, or the infection regains ascendancy when the initial reaction commences to fail in power.

Determination of the degree of activity and efficiency of the vital powers in any given case is impracticable, hence some general plan of treatment must be adopted for all. Opinion has been to some extent divided as to the most desirable method, and the chief differences have arisen in

connexion with the antiseptic system as laid down by Lister, and the physiological or phylacagogic system of Wright.

The question obviously resolves itself into that of the secondary sterilisation of wounds: in the one method an attempt is made to supplement the natural vital powers from without by the employment of chemical media to inhibit or destroy bacterial growth in the wound; in the second an attempt is made to modify and strengthen the vital powers by the local application of a simple physical process.

#### *Secondary Sterilisation of Wounds: Chemical Antiseptic Methods.*

In proceeding to a consideration of the comparative value of these two methods from the point of view of the surgeon it is well to first inquire what is to be hoped for by the use of chemical antiseptic media. Lister proved beyond any possibility of doubt the absolute efficiency of such media as prophylactic or preventive agents, yet both his teaching and writings indicate that he viewed the question of dealing with an established infection from an entirely different standpoint. Of this no better illustration can be found than in the sharp distinction which he drew between "bactericidal" and "inhibitory" media and the way in which he employed them respectively.

We may first ask is it possible by chemical means to effect the sterilisation of tissue lying beneath the surface of the wound? It has not been proven that any chemical antiseptic can penetrate the tissue in sufficient quantity or to a sufficient depth to exercise bactericidal powers, unless it is at the same time sufficiently powerful to damage or destroy the tissues themselves. As in other methods the deeper tissues must depend upon the vital process for sterilisation, or, as Lister terms it, the co-operation of the "natural antiseptic"—i.e., the constituent parts of the blood.

Before leaving this part of the question we may also ask whether a complete clearance of organisms from the tissues deep to the surface of the wound is a necessary preliminary to closure of the cavity. This question may be answered in the negative. Evidence is offered by the common observation that many wounds the surfaces of which are free of organisms may be safely and definitely closed if the surface be not disturbed or injured in the course of the operation, while others in which disturbance of the surface is necessary for the completion of the operation often flare up with a fresh infection. Moreover, the safety with which a serous cavity such as the peritoneal may be closed in the evident presence of a definite degree of infection supports this view; again, the less satisfactory experience of the long period during which the organisms which have given rise to an attack of osteomyelitis or enteric fever may remain latent, is familiar enough. A certain number of organisms may no doubt be safely left to their fate and for the tissues to deal with.

The virtues of chemical antiseptics are restricted to the power to render sterile the wound surfaces and the cavity included by them. If this sterilisation be effected the patient is protected from the dangers of a renewed direct extension of the infection and from the risk of absorption of toxins formed by the bacteria which may collect under pressure in the recesses of the wound cavity. Further, the dangers and ill-effects of prolonged suppuration may be avoided.

To effect this purpose Lister's essentials of a thoroughly trustworthy unirritating antiseptic, so stored up that it cannot be dissipated to a dangerous degree before the dressing is changed, must be fulfilled.<sup>4</sup> It is of interest to recall that Lister in 1870 made a suggestion for the primary treatment of gunshot wounds consisting in the provision of an abundant supply of external dressing soaked in an oily solution of carbolic acid,<sup>5</sup> and again during the Boer War suggested the use of a powder of the double cyanide of mercury and zinc as an antiseptic reservoir,<sup>6</sup> but neither of these methods was largely employed or successful in application.

#### *The Physiological Method.*

The phylacagogic or physiological method of Wright seeks to attain the same objects as the antiseptic method by the

<sup>4</sup> The Collected Papers of Joseph Lister, vol. II., p. 358, An Address on the Antiseptic Management of Wounds, 1893.

<sup>5</sup> Loc. cit., p. 161. A Method of Antiseptic Treatment Applicable to Wounded Soldiers in the Present War.

<sup>6</sup> Loc. cit., p. 331. Notes on the Double Cyanide of Mercury and Zinc as an Antiseptic Dressing.

<sup>3</sup> On the Principles of Antiseptic Surgery, Virchow's Festschrift, 1891, II., 344. The Collected Papers of Joseph Lister.

local application of a physical process to regulate, modify, and alternately augment the strength of the various factors involved in the normal vital reaction.

It seeks : 1. To maintain the patency of the opened-up lymphatic vessels and spaces which normally undergo closure in the same manner as the wounded blood-vessels, and to encourage an increased flow of lymph from the wound surface with the following objects. (a) To effect a natural lavage of the tissues. (b) To maintain an outward current in the flow and thus oppose the entrance of microbes into the tissues. (c) To utilise the bactericidal properties of the fluid. (d) To remove exhausted lymph from the tissues in place of leaving it to return by the normal route of the lymphatic circulation. (e) To maintain a moist surface to the wound, and wash away débris of devitalised tissue and bacteria. In this last particular simple irrigation on the part of the hypertonic or isotonic solutions plays an important part.

2. At a latter date to encourage and increase the number of migrating leucocytes, both with the view of increasing phagocytosis and providing a sufficient supply of active trypsin to aid the separation of sloughs.

The normal outflow of lymph is increased by the physical ("drawing") process induced by continuous irrigation of the wound with a hypertonic solution of sodium chloride, and the augmented migration of leucocytes by similar alternate irrigation with "isotonic" solution (normal saline).

Before attempting to gauge the relative value to be assigned to the antiseptic or to the phylacagogic methods respectively it may be at once allowed that in some instances the unaided normal vital reaction may attain parallel results when treatment with simple dressings or mere exposure to air and sunlight is adopted, but unfortunately such results form rather the exception than the rule. Hunter in referring to the good results which may follow primary closure of the wound, or closure by scab formation, deals with them as an exception, and tells us "thus a power of resolution is shown, even in cases where the parts have been exposed."

It may be proper here to offer some preliminary criticism as to the validity of the theory upon which the phylacagogic method is based. Hunter says : " Yet injuries often excite more action than is required " (iii., 260). It is, indeed, indubitable that in a large proportion of all wounds the activity of the reaction exceeds that necessary for the process of repair, or for sterilisation of the tissues, proceeding in some even to the undesirable degree of acute inflammation and tissue destruction. In fact, in the process of repair, as in the normal physiological processes of the body generally, a large margin of excess is allowed to meet possible accidents in the course of the closure of the wound.

I think we may therefore assume that the normal vital reaction is not, as a rule, deficient in activity, and that even in a wound that heals normally by granulation, both the outflow of lymph and the migration of leucocytes tend to be wasteful of the vital powers of the patient. Again, it must not be forgotten that an excessive lymph flow in itself is a serious drain upon the powers of the patient, a fact illustrated in a remarkable degree by the rapid emaciation seen to occur in the subjects of the multiple superficial wounds which have formed so strong a feature of the surgery of the present campaign. Lastly, any interference with the coagulation which limits the primary flow of lymph following the wound, tends to remove one of the most important barriers afforded by nature for the protection of the system from the dangers of absorption of organisms and their toxins from the infected area.

#### *Relative Value of Antiseptic and Physiological Methods.*

The most useful practical test of the efficiency of any method of wound treatment is furnished by observation of the date at which micro-organisms disappear from the surface of the exposed tissues and at which the wound may be safely and permanently closed by suture or other means. When subjected to this test the antiseptic method has proved itself more rapid and more trustworthy than the phylacagogic.

As an example of the antiseptic method, that known as the Carrel-Dakin is chosen, because it appears to fulfil the conditions already laid down, and because in the hands of its originator it has afforded admirable results which have moreover been repeated by other surgeons and in our camps. It may be at once allowed that the method demands special

care and exactitude in application, but such objections as may be raised as to its suitability for military surgery are of a practical and not of a theoretical nature. Such are the necessity of strict supervision of the standard composition of the solution of the hypochlorites employed, the need for care and judgment in locating the instillation tubes, the necessity of regularity in the instillations of the fluid, and the difficulty in some cases of ensuring that the patient's clothing and bedding do not get soaked. All these problems are more difficult of solution in military than in civil practice, but they are not insuperable, while the last trouble attends equally the irrigation forming a part of the phylacagogic method.

Allowing these practical difficulties, we find in compensation that the wound cleans more rapidly, firmer and healthier granulations form, the organisms die out more promptly, the occurrence of suppuration is reduced to a minimum, or actually avoided, secondary wound complications are rarer, and the wounds are fit for closure at a much earlier period. The treatment, moreover, attains success even when applied to suppurating wounds of some standing.

The special success which has attended the use of this method depends mainly on the highly ingenious plan of maintaining the constant supply of the antiseptic medium by specially devised tubes and on the character of the antiseptic employed. Other antiseptic methods, however, have attained results which, while less striking, yet are superior to those observed with the phylacagogic. Of these latter the most satisfactory have been the dressing with solution of hypochlorous acid (eusol) and the iodoform-bismuth method of Rutherford Morison.<sup>7</sup> The latter, which combines a maximum amount of rest to the wound, a "persistent storage" of an efficient inhibitory antiseptic, and a minimum of attention on the part of the surgeon, has much to recommend its employment in military surgery, where economy of time and labour is so important. Its employment as a primary method of treatment of gunshot wounds is, however, not free from serious risks, and therefore in the absence of further experience not advisable.

In application the phylacagogic method fails to realise the merits which have been claimed for it. The increased flow of serum from the tissues has proved of small value from the bactericidal aspect; the "fluid" "drawn" has been shown by other observers (Parry Morgan<sup>8</sup> and others) to be deficient in organic constituents, and hence incomparable to the normal lymph furnished in response to the stimulus of the original injury and resulting infection, and either in the "fluid" itself or admixtures of it with hypertonic salt solution organisms, such as the streptococci, grow freely. This deficiency in the quality of the "fluid" drawn is intelligible if it be regarded as the product of a local physical process exerted on the wound itself. Such a process can hardly be relied upon to induce great additional activity either in the fluid or cellular elements which are normally provided as a response to the combined stimulus of injury and subsequent infection on the organism as a whole, in which case we have to deal with a general vital reaction on the part of the entire system the whole intensity of which is directed upon the infected region. The phylacagogic method indeed, while attempting to increase the normal vital reaction within the tissues, an object not always to be desired, deals inefficiently with the extraneous elements in the wound cavity which form the main obstacle to normal healing.

In practice it is found with the phylacagogic method that the initial changes in the wound are slow, the tissues tend to become sodden, the separation of sloughs is delayed, and a longer period is required before the wound surface can be regarded as having reached the stage at which secondary closure can be effected. Hence the period in which secondary wound complications may arise is prolonged. Moreover, in cases treated by the hypertonic method which fail to reach the "closure" standard, a few days' treatment with an antiseptic often suffices to attain the result desired.

In passing from the subject of the local treatment of the wound we may conclude with Hunter that "the stimulus of imperfection taking place immediately calls forth the action of restoration"; further, that this vital operation may be most effectively aided not by striving to regulate and modify the process, but by attempting to nullify the influence of the factors which tend to distort and interrupt it.

<sup>7</sup> THE LANCET, 1916, II., 268.

<sup>8</sup> Brit. Med. Jour., 1916, I., 685.

*Gas Gangrene.*

I can scarcely leave the subject of wound treatment in the present war without a word of mention of the most serious wound complication that has had to be dealt with, gaseous cellulitis or gas gangrene.

I can find no evidence that Hunter was familiar with this scourge. In the lectures on gunshot wounds a case is quoted in which "air came out of the wound" during the process of removal of a ball from the abdominal wall, but no mention is made of any special condition of the tissues, and it may well have been a *Bacterium coli* infection secondary to a minor injury of the colon. Hunter was certainly conversant with the rapid decomposition, with development of cellular emphysema, which sometimes follows death as a result of a general anaerobic infection of the body; hence we must conclude that he would have been quick to detect a similar form of cellulitis during life.

It seems more than doubtful whether gas gangrene has ever before assumed such a serious aspect during war. The writings of Ambroise Paré make no mention of emphysema as a sign in the gangrenous wounds observed by him, neither do the more modern writings of Guthrie suggest that the hospital gangrene seen in the wars of the early part of the last century in any way resembled the "gas gangrene" of to-day. It is clear that Lister, when speaking of hospital gangrene, referred to a process similar to that described by Guthrie, and surgical text-books generally have based their descriptions of hospital gangrene on a complex of identical signs. On the other hand, anaerobic gangrene, under the title of "acute traumatic gangrene," has been individualised as a definite disease and its pathology to some extent elucidated.

It is clear that the form of hospital gangrene observed during the American War of the Rebellion coincided in character with that described by Guthrie, and it is specially mentioned that the process did not involve the muscles; lastly, no mention of "gas gangrene" has been made in any of the more recent campaigns.

Hence I think it must be allowed that the frequency of gas gangrene is to be regarded as a peculiarity of this war, referable, perhaps, to the nature of the soil, and perhaps to the abundant diet of the men and irregularity in defaecation. In the latter relation it is a striking fact that of a small series of patients who died as a result of wounds of the colon in every case a general post-mortem anaerobic infection of the blood rapidly took place.

On the other hand, hospital gangrene of the classical types has been conspicuous only by its absence; during a period of two and a half years I have only seen one or two cases which seemed to resemble the spongy form, although the membranous type has been occasionally seen.

**HUNTERIAN LIGATION.**

No individual procedure originated by John Hunter has preserved the freshness of his name to a greater degree than the operation for the cure of popliteal aneurysm. Every student of medicine at an early date of his career makes acquaintance with Hunter's canal, and later with the principle of proximal ligation.

In one respect the influence exerted on military surgery by the knowledge of the ease and safety with which proximal ligation can be performed has not been for the good. It has encouraged the employment of proximal ligation at the seat of election for secondary haemorrhage and even for primary bleeding from a wounded artery. Both these practices are to be condemned except in rare instances of absolute necessity.

It is to be regretted that Hunter himself did not write the paper describing his operation and the grounds upon which he was led to undertake it, but the paper by Sir Everard Home included among Hunter's writings opens up one question of considerable interest to-day. In at least one of the cases there described (iii., 604, Case 3), possibly in the first three both the femoral artery and vein were included in the ligation, in the fourth we are definitely told that the artery only was included. From that period onwards surgical opinion has been definitely to the effect that the greatest care should be taken when occluding a main artery to avoid all injury to the vein. In fact, every operation for the ligation of an artery has been so devised that the aneurysm needle is passed in a direction away from the vein in order to minimise the risk of injury to that vessel. This not alone to avoid the technical inconvenience of immediate haemorrhage, but also with the definite object of preserving the venous circulation intact.

*Effect of Simultaneous Ligature of Artery and Vein.*

Observation of a large number of coincident wounds of large arteries and veins has in no way endorsed the view that simultaneous occlusion of both artery and vein exercises any deleterious influence on the subsequent collateral arterial circulation and the vitality of the limb. In support of this statement a few examples illustrating the innocuous nature of operations for the occlusion of veins in general may be first given. Operations for the cure of varicose veins have demonstrated the ease with which a compensatory balance is attained when the blood is diverted from the larger channels. Occlusion of the internal jugular and other large venous trunks effected in order to prevent the diffusion of septic emboli (the process of septic thrombosis was, I believe, first observed and described by John Hunter himself (iii., 581)) has not given rise to obvious permanent trouble.

In a very considerable proportion of gunshot injuries to large arterial trunks the neighbouring vein is contused and becomes thrombosed, and this has not been shown to give rise to increased risk of gangrene of the limbs. Ligature of the common carotid artery together with the internal jugular vein *en masse* has been performed in cases of emergency without increased risk of the development of the cerebral anaemia and softening so often a consequence of ligature of the artery alone. Further, where simultaneous ligature of both artery and vein in other parts of the body has been obligatory on account of wounds of both vessels untoward events have not been observed.

Evidence, moreover, exists that under certain conditions simultaneous occlusion of both artery and vein is a preferable procedure. The first example, not an unmixed or simple one, may be sought in the results observed to follow the application of a single proximal ligature to the artery in cases of arterio-venous aneurysm or aneurysmal varices of the femoral vessels. In patients so treated during the South African campaign,<sup>9</sup> gangrene of the limb followed in more than 50 per cent. of the cases. The frequency of this accident finds a simple explanation if we consider what actually results from the operation. The main vessel being occluded and the direct arterial pressure from behind being abolished, blood which has been carried by the arterial collaterals to the distal portion of the injured trunk, instead of passing to the peripheral circulation, takes the course of least resistance backwards into the vein through the arterio-venous communication, and thus the limb practically bleeds to death much in the same way as if the distal end of the wounded artery opened on to the surface of the limb. Hence, the comparative safety of removal of the communication *en masse* and occlusion of all four openings by ligature.<sup>10 11</sup>

A more striking example is offered by the result of ligaturing the popliteal vein alone for the treatment of senile gangrene of the foot. W. A. Oppel,<sup>12</sup> ascribing the good results occasionally observed to follow arterio-venous anastomosis for the cure of this condition to control of the venous circulation and consequent rise in the blood pressure of the limb, was led to substitute simple occlusion of the popliteal vein to produce the same effects. In six cases thus treated the extremities were seen to recover not only their warmth and colour without the development of oedema, but also a certain degree of hyperaemia of the feet and toes.

On these and other grounds it must be admitted that the balance of the collateral circulation is likely to be more efficiently maintained if the vessels which carry it on more nearly correspond in size and consequent equality in the blood pressure and rate of flow. The elimination, in fact, of the capacious main vein is a real advantage, since this for the time affords a too ready channel of exit for the diminished arterial supply as well as an undesirable reservoir for stagnation.

These considerations lead me not only to regard obligatory simultaneous occlusion of a main artery and vein as a negligible factor in the risk of gangrene of a limb, but to hold, further, that the procedure is preferable whether the vein be wounded or not; the result of the combined procedure being to maintain within the limb for a longer period

<sup>9</sup> Reports on the Surgical Cases noted in the South African War 1899-1902, Surgeon-General W. F. Stevenson.

<sup>10</sup> K. Saigo: Traumatische Aneurysmen im japanisch-russischen Krieg. Deutsch. Zeitsch. für Chir., 1906, lxxxv., 577.

<sup>11</sup> Leo Bornhaupt: Gefäßverletzungen und traumatische Aneurysmen im russisch-japanischen Krieg. Arch. für klin. Chir., 1905, lxxvi., 560.

<sup>12</sup> Zentralbl. für Chir., 1913, II., 1241-42.

the smaller amount of blood supplied by the collateral arterial circulation, and hence to improve the conditions necessary for the preservation of the vitality of the limb.

#### INFLUENCE OF HUNTER'S EXPERIENCE IN THE FIELD ON HIS LIFE WORK.

We may now turn from the question of how far the work of John Hunter has influenced that of the military surgeon of to-day to that of how his experience gained in the field may have influenced his own life's work.

Hunter was emphatically a student of nature; his early years were, as we know, spent mainly in the fields around his home, where he sought out such secrets as he could from his surroundings. This fallow period, while responsible for depriving him of a facile pen and literary style, yet no doubt opened his mind, developed habits of thought and observation, and affords some explanation of the superhuman task to which he set himself with such devotion in the later periods of his life.

The whole world was his book, and it is of some interest in passing to contrast the character of his upgrowth and surroundings with those of his greatest successor, Joseph Lister. Hunter gained his earliest inspiration from the limitless field of nature with naked eye and unbridled freedom. Lister, born into a home the cradle of the modern microscope, passed through a blameless career at school and college in a continuous atmosphere of scientific thought and investigation. Both great men devoted their whole energies to the cultivation of science throughout a busy and industrious life—Hunter throughout with a yearning for the pedestal, Lister concerned only with the success of his labours.

Hunter died in the midst of an incompletely and impossible task, while Lister had the incomparable satisfaction of witnessing the success of his own efforts, the goal reached, and the benefit to mankind immeasurable. Each illustrious man, however, perhaps found his proper field: Hunter in a life of continuous stress, immoderate labour, a struggle for his daily bread and the means to pursue his researches, and a tragic death not unsuited to the fiery nature of the man. Lister in a more equable existence, spent in steady and industrious pursuit of the one great object he had in view, and after attaining a success duly appreciated by the whole world passed quietly away in the zenith of his fame.

The abrupt change from a boyhood of untrammeled freedom to the life of a hard-worked demonstrator in a school of anatomy, than which no greater contrast can be conceived, laid heavy hands on Hunter, his health began to fail, and hence his transit to the field of war.

To join an army in the field is to enter the most intimate school of human nature. The most admirable features of man's character and the meanest are alike displayed. Unsuspected strength is revealed, long concealed weakness exposed, and in a year's campaign the events of a whole lifetime of ordinary existence may be passed through. Hunter entered this school at a turning-point in his career after two periods—the one of comparative idleness, the second of drudgery—and little doubt can exist as to both the sobering and inspiring effect it had upon his nature. As a result of his experiences he emerged a stronger and a better man, with a vastly wider outlook on the world, and doubtless capable of forming a juster estimate of his own powers and capacity to undertake the line of life for which he felt himself to be fitted.

The life of a military surgeon on active service, however, offers advantages beyond the mere acquisition of worldly wisdom and a knowledge of men. An army is not always fighting, and the surgeon, between periods of active and unceasing work, has intervals of quietude which are rare in any other path of professional life. Freedom from the cares of ordinary business and the manifold duties of practice allows uninterrupted opportunities for following out lines of thought and the prosecution of research. There can be no doubt Hunter utilised these opportunities to the utmost, for throughout his writings references are made to observations and investigations made during his period of service. He tells us, in fact, that his most comprehensive and complete contribution to scientific literature, the "Treatise on the Blood, Inflammation, and Gunshot Wounds," was the direct product of the experience gathered at that time. The long period which elapsed between the conception of the work and its publication is characteristic of Hunter's method—a method founded on the desire to complete his knowledge on any subject before submitting himself to public criticism.

A method desirable in itself, but when adopted by a man whose aims are of the scope of Hunter's, too often, as in his own case, robs the world of receiving the benefits of a wealth of critical observation and knowledge which passes together with its owner to the grave.

#### *Research in the Present War.*

While considering the opportunities of research his military life afforded to Hunter, one cannot help comparing them with those enjoyed by the present generation. During this campaign laboratories both of the clinical type and those fitted for more extensive research have been provided not only for the base hospitals but also in connexion with the casualty clearing stations which have performed so much of the duties of stationary hospitals near the front.

A number of active young observers have been engaged in research on every problem which the wounds and diseases of the soldiers have raised, and it may be confidently expected that a weighty harvest of new facts will have been garnered when opportunity arises for their collation and digestion. The pathological anatomy of the lesions produced by gunshot injury to the brain, the spinal cord, the lungs, heart, and the abdominal viscera has been worked out to an extent that will leave little to desire. New facts regarding cerebral localisation have been noted, while others founded on animal experiments alone have been confirmed by injuries comparable to the knife of the physiologist.

Observations regarding the fevers of the field have been accumulated, and enormous practical experience of the value of the protective inoculation for enteric fevers has been acquired, while the prophylactic value of tetanus antitoxin and its influence in modifying the character of a subsequent attack has been placed beyond the region of doubt.

It is not perhaps too much to expect that not only the acquisition of this extended knowledge, but also the manner of its acquisition, will exert an enduring influence upon the workers to whom we are indebted for it, and a resulting benefit will be conferred upon the community as a slight return for the misery and suffering which have been imposed upon the present generation. May we not hope that many of the workers may be influenced as John Hunter was and remain to the end of their careers active searchers after, and exponents of, the secrets of nature as well as better practitioners of medicine.

#### CONCLUSION.

Many of my predecessors have striven with a varying measure of success to portray Hunter as a man and member of society, yet the strange paucity of material at command appears to render any estimate of his personality from this point of view incomplete and uncertain. I prefer to ask my audience to study his presentment as it hangs upon the wall before us, and from its inspiration to try to form a true conception of the man and the soul that was within him.

The concrete labour of his hands is still exhibited within these walls, while the germs contained in his writings have served to incite and direct the minds of the many searchers in the wide field of biology who have followed in his footsteps. If but one lesson could be learned—the secret of his untiring industry—and this pressed home on those whose privilege it is to follow in his path great indeed might be the benefit to mankind. The problems that to-day await solution are no less numerous or less vital than those John Hunter sought to unravel, while the constantly increasing means of investigation at command lay a growing responsibility upon the student.

The memory of John Hunter is fresh within these walls, and it is still green without, and I cannot perhaps better close this unworthy effort to sustain that memory than by quoting the words of one of his bitterest foes regarding the period of Hunter's life immediately following his return from the wars.

"During this time he found himself at leisure for meditating plans of life that plainly denote an intrepidity of mind and a vigour of application which natural obstacles unsurmountable by most could not suppress in him; (plans) which few have attempted although supplied by the completest aid of early academic learning."<sup>13</sup>

Mr. President, posterity has judged how far Hunter succeeded in his aims, and has within the walls of this College awarded him a standing memorial which would, I think, have satisfied the man himself.

<sup>13</sup> Jesse Foot, Life of J. Hunter, p. 82.

## An Address

ON

### NAVAL MEDICINE IN THE GREAT WAR.

*Delivered at the Medical Society of London  
on Feb. 12th, 1917,*

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#### MEDICAL PERSONNEL.

MR. PRESIDENT AND GENTLEMEN.—At the outbreak of war the permanent Medical Service of the Navy, with Sir Arthur May as Medical Director-General, was at once expanded by the mobilisation of its retired members, of officers on the emergency list, and of the medical officers of the Royal Naval Volunteer Reserve. In addition, a large number of temporary surgeons were entered, and about ten consultants were appointed, mainly to the large base hospitals. A considerable proportion of the temporary surgeons first passed through the large naval hospitals and received some instruction in naval routine and procedure. Rather later an old type of naval medical officer—viz., allied to that of surgeon's mate—was revived in the appointment of unqualified medical students who had passed their examination in anatomy and physiology, under the title of Surgeon-Probationers, R.N.V.R. They were usually appointed in batches of 15 to Haslar, where they were instructed in Service routine, accounts and returns, victualling of the sick and treatment of wounded in action, and were subsequently drafted to destroyers, which ordinarily do not carry medical officers, and to other small sea-going ships, to render first-aid. After a certain period of service many of them were granted leave to prepare for and pass their final examinations, and so to become temporary surgeons.

The work of the clinical laboratories of the large base hospitals was assisted by the utilisation of men with laboratory knowledge but without medical qualifications, who, however, did not receive naval rank. Dr. P. Fildes was sent to Haslar by the Medical Research Committee and was of the greatest use in dealing with the bacteriological examination of the numerous convalescents from dysentery, enteric fever, and other intestinal diseases sent from Gallipoli.

Queen Alexandra's Royal Naval Nursing Service was more than trebled by the mobilisation of the reserve nursing sisters. The number of nursing sisters at the large base hospitals was thus very largely increased and they were supplied to the hospital ships, which usually carry four nursing sisters, two regulars and two reserves. The existing sick-berth staff, which was considerably depleted when the Fleet was mobilised, was supplemented by the Naval Auxiliary Sick Berth Reserve, composed mainly of men from the St. John Ambulance Brigade.

#### TRANSPORT OF THE WOUNDED AND SICK.

Transport duties are familiar to naval officers, and their services have naturally been utilised during the war. The naval transport, both at home and abroad, has been under the control of Surgeon-General Sir James Porter, K.C.B., who, early in 1915, went out to supervise the transport arrangements in Gallipoli for the Army as well as the Navy. Fresh developments in methods of transport, such as a new ambulance sling (Boydon), a monowheel stretcher-carrier (Rev. B. Close), the use of the movable-cot system on ambulance trains, and improvements on hospital ships have been evolved.

*Ambulance trains.*—Of the four naval ambulance trains in use at present in this country, the larger ones, made up of 12 coaches and carrying 120 cot cases, travel from the north to the south as occasion requires, in ordinary times about twice in ten days. Once a week they take the patients off the hospital ships, and rather less often they collect patients from the naval hospitals in the vicinity of the naval bases. The patients are dropped in succession at the large naval hospitals, Plymouth, Haslar, Chatham, and occasionally at Portland. These, colloquially called "round" trains, carry two medical officers, a crew of 36 stewards and sick-berth attendants,

but no female nurses. Two padded rooms are provided for the reception of lunatics. A small ambulance train of six coaches, called "the shuttle," travels locally between the naval bases and the local hospitals. Sir James Porter and Acting Staff-Surgeon A. V. Elder, R.N.V.R., devised a plan whereby the Service cot, into which the patient is placed in his own ship or in the hospital ship, is securely suspended and lashed up against the fender at the side of the coach in the ambulance train, thus avoiding the fatigue necessitated by transfer from a stretcher to a fixed cot in the ambulance train.

*Hospital ships.*—The experience of the present war has somewhat modified previous conceptions of the uses of hospital ships. In peace-time a hospital ship accompanies the Fleet and serves as a mobile base hospital until it becomes full, when she leaves the Fleet in order to discharge the patients to a land hospital, and for the time acts as a marine medical transport, or, in other words, a marine ambulance (Elder<sup>1</sup>). In the South African War (1899-1902), in the transport of wounded and sick across the Channel, and in the case of their service between the Mediterranean and this country at the present time, our hospital ships did, and now, act as "Marine Ambulances"; and in the Russo-Japanese War (1904-5) the two Japanese naval hospital ships worked on these lines. In modern naval engagements, contrary to what might have been anticipated,<sup>2</sup> the hospital ships cannot accompany the Fleet and take charge of the wounded for the following reasons: (1) the hospital ships could not keep up with the rapidly moving battleships; (2) the transfer of wounded from a battleship to the hospital ship would be possible only in exceptionally calm conditions; and (3) the transfer of wounded would oblige the battleship to have to, and thus expose it to hostile submarine attack. In order to meet this want it has been suggested that fast vessels of about 500 tons, registered under the Geneva Convention, and fitted with appliances for rapidly picking up survivors from the sea, should be employed on the scene of a recent action. But this plan has not been put into effect.

The use of hospital ships in war-time may, as Elder points out, be divided into: 1. The intervals between actions, during which the hospital ship remains at the naval base until it is full—for four or more weeks—and then discharges its patients, by steaming to a railhead, to an ambulance train. During its stay at the naval base the load of the hospital ship may be lightened from time to time, and its stay thus prolonged, by evacuation of some patients to a hospital carrier which conveys them to a land hospital or ambulance train. A large number of surgical operations are performed in a hospital ship during its stationary period at a naval base and minor cases when cured return to duty in the Fleet.

2. The post-action phase, when the hospital ships are collected at the naval bases to await the arrival of the battleships, receive the wounded, and serve as clearing stations. The wounded and burnt are sorted and as rapidly as possible evacuated to the shore and to the ambulance trains. Severe cases, which would obviously suffer from transport, are taken to the comparatively small hospitals in the immediate neighbourhood, but all suitable cases are at once despatched by the ambulance trains to the large base hospitals in the south of England, so as to clear the land hospitals in the vicinity of the naval bases for the reception of further instalments of wounded.

Immediately after a battle, therefore, a hospital ship ceases to act as a base hospital and becomes a clearing station, and should be evacuated as rapidly as possible, as their capacity for cot cases—on an average 250—does not admit of any extension. It should be added that a hospital ship may be employed as a permanent floating hospital for infectious diseases at a naval base which is remote from such hospitals on land.

Hospital ships, like ambulance trains, had to be brought into being when war broke out, and were provided by the transformation of liners. They were staffed by the existing executive crews of the company and by naval medical officers, with a Fleet-Surgeon in charge, and with nursing sisters.

<sup>1</sup> Elder, A. V.: On Hospital Ships and Their Functions, Jour. Roy. Nav. Med. Service, 1916, II., 443.

<sup>2</sup> At the Battle of the Yellow Sea on August 10th, 1904, the Russian hospital ships followed their Fleet, and, as the Japanese point out, ran the risk of being accidentally torpedoed. (The Surgical and Medical History of the Naval War between Japan and Russia (1904-1905), 1911, pp. 121, 150.)

## THE HEALTH OF THE NAVY.

In considering this subject a distinction may conveniently be made between the health of (i.) the shore depôts and training establishments; (ii.) the Service afloat; and (iii.) the Royal Naval Division and the Marines serving on land.

I.—*The Shore Depôts and Training Establishments.*

The barracks, depôts, and training establishments are more exposed than the Service afloat to invasion by epidemic and other infections on account of their contact with the civilian population, the influx of new entries, and, especially in the case of the boy-training establishments, by the massing together of large numbers of youths who are more susceptible than adults to many of the common epidemic affections. Further, the health of the Fleet has been protected by the adoption of quarantine measures as regards drafts sent to it from the shore depôts. The liability of the shore establishments to epidemic disease is shown by the incidence of cerebro-spinal fever; out of 274 cases in the Navy during the first two years of the war, 252, or 92 per cent., occurred on shore; thus, there were 63 in the Portsmouth area, 58 in the Plymouth area (including 22 cases from boy-training ships), 42 at the Crystal Palace depôt, 39 in the Chatham area, 27 at the Deal depôt, and 18 at Shotley.<sup>3</sup> Shetlanders in barracks suffered much from measles, probably on account of the absence of any racial immunity to this disease.

II.—*The Service Afloat.*

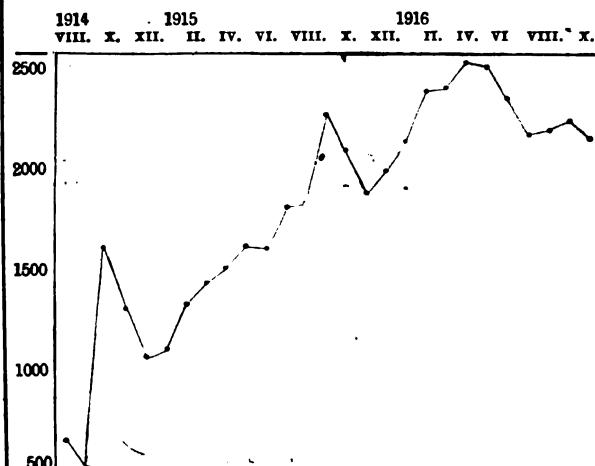
The health of the Fleet—our first line of defence—is of such paramount importance that it demands more detailed description. Under this heading reference will be made first to the Grand Fleet in home waters and then to the Mediterranean Fleet.

*The Grand Fleet.*—The general health of the Grand Fleet has been extremely good, indeed probably better than in times of peace. The average daily percentage of sick in the whole Fleet in 1913 was 2.37, and in 1914 a little lower, 2.03. Since the outset of war cases of sickness have naturally been sent off to hospital more rapidly than in peace time, and thus the daily sickness in the Fleet is diminished. But even allowing for this, the average daily sickness in the Grand Fleet has been extremely low, almost always under 1 per cent., and indeed has fallen since the outbreak of war. This percentage incidence would have been even less had it not been for the higher rate of sickness among the reservists and pensioners. Most of the sickness was of a minor character, such as seasonal influenza and boils.

*Infectious diseases.*—Measles, mumps, rubella, scarlet fever, and diphtheria occurred, but in the majority of instances they subsided after the appearance of the initial cases. An interesting point was the severity of measles among the Shetlanders both on the Fleet and among the reservists stationed at Lerwick, where there was a severe epidemic early in 1915 (McVittie). In ordinary times measles is rarely seen in the Shetlands, but when it is introduced an epidemic results. This severity of the disease in a race unprotected against it recalls the devastating epidemics of measles in the adjacent Faroe Islands in 1781 and 1846, in Fiji in 1875 and 1907, and in the neighbouring island of Rotuma in 1911 (Corney<sup>4</sup>). Dr. R. P. Heddle, medical officer of health of Kirkwall, writes that in some of the Orkneys measles is often absent for 15 or 20 years, and that when it occurs the children have it in much the same manner as in the south, but that adults take it severely and often suffer from pneumonia and occasionally from meningitis. I saw a relapse of measles in a Shetlander on the twenty-eighth day of the disease at Chatham—an extremely rare event. No case of small-pox occurred in the Fleet, thus showing the value of vaccination which has been compulsory in the Navy since about 1858. Except in the Mediterranean Fleet there were very few cases of enteric fever. Small outbreaks in three ships were traced respectively to infected oysters dredged up from Langstone Harbour, near Portsmouth, to a carrier, and probably to contaminated water taken on board at Montreal.

With the prolongation of the war it would naturally be expected that the amount of sickness would increase, and study of a curve showing the monthly average of officers and men in the large naval hospitals, Chatham, Haslar, Plymouth,

for the figures of which I am indebted to Surgeon-General D. T. Hoskyn, Surgeon-General G. Welch, and Surgeon-General W. H. Norman, shows that, allowing for two peaks due to extraneous causes (campaigns on land), there was a gradual rise from the beginning of the war until April, 1916, after which there came a slight fall. This would at first sight appear to confirm the anticipation of increased sickness. But, as already mentioned, the daily average percentage of sick in the Fleet had fallen during this period,



Graph of the monthly daily average of officers and men of all naval branches in the large naval hospitals at Chatham, Haslar, and Plymouth. The steep rise in October, 1914, was due to the admission of a large number of Belgian officers and men. The rise in September and October, 1915, was coincident with a large influx of patients from the Royal Naval Division on Gallipoli.

and it is therefore probable that the absolute increase of sickness, as shown by returns of the hospitals, is mainly due to the steady increase in the strength of the Navy during the progress of the war. Although there are, of course, no official figures obtainable as to the present strength of the Navy, it may well have so increased as to account for the doubling of the absolute number of sick, while the relative percentage incidence in the Grand Fleet has even fallen.

*The Mediterranean Fleet.*—In the Eastern Mediterranean squadron during August, October, and November, 1915, almost every ship was attacked by epidemic gastro-enteritis, which, however, died down in December. There was a fair number of cases of typhoid, paratyphoid, and dysentery between August and the end of December, 1915. The dysentery was mainly amoebic, and in many cases was associated with jaundice. The infection of these diseases was probably conveyed by flies and by men returning from the beach. The health of the Adriatic squadron at this time was excellent, and the average daily sickness for the whole Mediterranean Fleet from August 15th, 1915, to Oct. 31st, 1915, was 2.24 per cent., and from Nov. 1st, 1915, to Jan. 31st, 1916, 1.52. This compares favourably with a daily percentage of 2.37 sick for the whole Fleet in 1913. From Feb. 1st to April 30th, 1916, the health of the Fleet was even better with a daily percentage of 1. Between May 1st and July 31st, 1916, the daily average of sick was 1.14 per cent. A mild form of pyrexia (sand-fly fever) was prevalent at Salonika in May and appeared in some of the ships in the Eastern Mediterranean, and at intervals cases of paratyphoid, dysentery, and malaria occurred. In the quarter ending Oct. 31st, 1916, the daily percentage of sick was 1.08; dysentery and malaria were less frequent than in the previous three months, and typhoid and paratyphoid rare. No cases of beri-beri have been reported from the Mediterranean Fleet. For this information I am indebted to Sir A. May and his assistant, Fleet-Surgeon W. L. Martin, R.N.

During August and September, 1915, there was an extensive epidemic of dengue at Bermuda, and the average incidence of the disease in men of war there was 3 per cent. only. Meagher's<sup>5</sup> observations there support the view that the disease is spread by mosquitoes.

The good bill of health of the Fleet as a whole—a tribute to preventive medicine—is due to the following factors:

<sup>3</sup> THE LANCET, 1915, ii., 909; 1917, i., 54.  
<sup>4</sup> Corney: Proc. Roy. Soc. Med., 1913, vi. (Sect. Epidem.), 138.

<sup>5</sup> Meagher: Journ. Roy. Nav. Med. Service, 1916, ii., 188.

1. The comparative isolation of the fleets, and especially of the Grand Fleet, thus necessitating absence of venereal disease and of opportunities for alcoholic excess incident to the temptations of seaports. In the Fleet the men's daily allowance of stimulant is half a gill of rum, and special precautions are taken to prevent the adsorption of unused allowances by other men. 2. The quarantine precautions in drafting from the shore establishments to the Fleet, instituted by the Medical Director-General, Sir Arthur May. 3. The lectures given by the medical officers to the ships' crews on personal hygiene, dealing especially with the dangers of venereal disease and alcoholic excess. These lectures appealed to the common sense of the men, and as an illustration of their good effect it may be mentioned that on the return from leave of the men (about 1100) of one great battleship there were only three cases of gonorrhœa and one of syphilis. 4. Measures to obviate the effects of monotony entailed by awaiting events which have been long anticipated. Thus, when possible, regattas, boxing competitions, and other entertainments are got up, and both by their preparation and performance brighten up the men. In the Grand Fleet the short days of winter are the most trying, and then, in addition to entertainments, lectures, for example, by those who have made visits to the front in France, and cinema shows serve a useful purpose. Each big ship has its cinema, and there is a scheme of circulating films between the various ships. Periodical leave is also provided. 5. Improvement in the ventilation of the ships, due to the adoption in 1914 of the recommendations of a committee, of which Fleet-Surgeon R. C. Munday was the secretary, appointed in October, 1912, to consider the best methods of ventilating modern warships.

*Influence of mobilisation and war on the health of the navy.*—After this summary of the satisfactory state of the health of the Fleet a few words may be said as to the bad influence which mobilisation and war might be expected to exert on the health of the Navy. Large numbers, running into tens of thousands of men of the Royal Naval Volunteer Reserve, the Royal Naval Reserve, and the Fleet Reserve were called up and had necessarily to be rapidly passed into the ships during the first few days of the war, and as a result a certain proportion of unfit slipped through. The incidence of sickness was therefore naturally much higher in the Royal Naval Volunteer Reserve and Royal Naval Reserve than in the Royal Navy, which may be regarded as a picked body of healthy men. Cases of failure of cardiac compensation, of relapses in pulmonary tuberculosis, and of diseases which had previously led to discharge from the service were not infrequent, and dental caries and insufficiency extremely common. As cases of organic valvular disease of the heart are invalidated out of the service, malignant endocarditis, which usually supervenes on existing valvular disease, is a rare disease in peace time—averaging about two cases a year. Since the outbreak of war I have seen ten fatal cases (six examined post mortem) and one of that exceptional but allied condition malignant aortitis, chiefly but not entirely in reservists and pensioners.

In addition to the cases in the Navy a case occurred at Haslar of acute malignant endocarditis in a Belgian soldier who was for months under treatment for severe burns; after being normal for a long time the temperature suddenly shot up and the patient died in 12 days with, as the necropsy proved, acute malignant endocarditis. The interest of the case is that the onset and duration of the disease could be accurately determined.

The numerous new entries, mostly quite young, who are exposed to the depressing conditions incident to their change of life, such as vaccination, the fatigue of unaccustomed drills, and homesickness, provide a favourable soil for the occurrence of infectious diseases, such as measles, rubella, scarlet fever, mumps, and cerebro-spinal fever. Outbreaks of infectious diseases occurred, but it is remarkable that there was not more illness.

The effect of long-continued strain on men, especially pensioners and reservists, in activating latent disease, such as tuberculosis or heart disease, was naturally seen. In the Navy these two conditions lead to invaliding, and their recrudescence was therefore more frequent among reservists and pensioners called up for the duration of the war. Pulmonary tuberculosis in ships was not so frequent as some anticipated from the conditions necessitated by the war

strain, physical and mental, precipitated tabes dorsalis and general paralysis of the insane in some syphilitic subjects; and a generous view from the pension aspect has been adopted by the Admiralty. Some cases of incipient tabes have been utilised by work of a less arduous physical character. During the siege of Paris in 1870 it was noted that exophthalmic goitre became more frequent, and this has appeared to me to be true, both during the Boer War and the present campaign. Much discussion has taken place as to the influence of hyperthyroidism in the etiology of the so-called soldier's heart. Over-excitation of the ductless glands may result from excitement or from toxæmia due to acute infections; and Hurst<sup>6</sup> points out that as over-activity of the thyroid can be more easily recognised than that of the other ductless glands the resulting condition has been regarded as simple hyperthyroidism, but that the change is more complex, being really a disturbance in the activity of all the ductless glands. Diabetes mellitus, the incidence of which might conceivably be favoured by nervous strain, does not appear to me to have become unduly frequent.

The prolonged and monotonous strain necessitated by life in the Fleet favours mental deterioration, psychasthenia, and neurasthenia, especially in those with a neurotic taint and in those who have not been through a long training. Further, the short interludes of acute stress and excitement which punctuate the periods of monotonous alertness may so disturb the already vibrating balance as to precipitate an acute breakdown with violent though transient symptoms and delusions. The burden of responsibility and in a small ship the influence of comparative isolation on the senior officer favour mental instability, and may lead to a want of self-confidence bred of brain-fag. In an interesting psychological study of the influence of periods of (1) monotonous watchfulness, (2) acute stress, and (3) comparative calm on a ship's company during the first six months of the war, Beaton<sup>7</sup> found that mental troubles of a really serious nature occurred in less than 1 per cent. and mild neurasthenic conditions in less than 4 per cent. With the prolongation of the war the results of the continued and monotonous strain would naturally be expected to become more noticeable, but, as far as my impression goes, not to anything like the extent that would have been expected. This happy result is no doubt due to several factors—the fine spirit of confident superiority in the men, and the hygienic measures already mentioned. The effect of good moral in preventing mental disturbance was seen by the freedom of the men from these manifestations after the Jutland Battle.

*Casualties during action.*—With this subject I can attempt to deal in very brief and imperfect outline only. As compared with land warfare, the large number of men killed outright in naval actions is striking. In the Russo-Japanese naval war of 1904–05 there were 3692 killed and wounded, of whom 1883 were killed outright (including 1388 probably drowned<sup>8</sup>). It is not considered advisable in the public interest to give the figures for the Battle of Jutland, but from the total loss of battleships the numbers of men presumed to be drowned, though, of course, many in the sunk ships may have been killed, wounded, or burnt, must obviously have been very large.

*Wounds.*—As compared with wounds in the trenches, where the clothing and skin are ingrained with filth, wounds in naval actions obviously differ, and have been classed with those of severe machinery accidents. Wounds of soft parts and compound fractures were due to shells, their splinters, shrapnel, and fragments of the ship's structures. Several cases of eye injuries necessitated enucleation, and in one remarkable instance an eye was found to contain a piece of bone  $\frac{1}{2}$  inch square, apparently from the vault of another man's skull (L. Fraser<sup>9</sup>). The treatment of wounds by new antiseptic applications has been advocated by Sir Watson Cheyne (borsal), who also investigated Dakin's antiseptic, and a green spray of perchloride of mercury and malachite green (Fildes, Rajchman, and Cheattle<sup>10</sup>) has been used with success at Haslar. The rival claims of the antiseptic method and of the physiological hypertonic salt solution treatment have led to an

<sup>6</sup> Hurst, A. F.: *Medical Diseases of the War*, p. 127, 1917.

<sup>7</sup> Beaton, T.: *Jour. Roy. Nav. Med. Serv.*, 1915, II., 447.

<sup>8</sup> The Medical and Surgical History of the Naval War between Japan and Russia (1904–1905), 1911, p. 588.

<sup>9</sup> Fraser, L.: *Journ. Roy. Nav. Med. Serv.*, 1916, II., 440.

<sup>10</sup> THE LANCET, 1915, II., 165.

encounter between the President of the Royal College of Surgeons and Sir Almroth Wright.

*Burns* form an important proportion—at least a third—of the casualties in action, and fall into two main categories: 1. General and severe burns due to the ignition of our own cordite or to burning furniture. As the result of prolonged exposure to these flames destruction of the tissues is deep, the immediate mortality high, and sepsis and deformity especially prone to occur. 2. Burns of the exposed skin of the face and hands due to the momentary flash of high-explosive shells in a confined space. The flash is of such short duration that from instinctive closure the eyes escape, and the thinnest covering, provided it is not inflammable, almost completely protects the skin (Muir<sup>11</sup>). In the *Lion* about half the wounded had burns of the face and hands alone (Maclean and Stephens<sup>12</sup>). There seems to have been a general agreement that the Service picric-acid dressing was most efficacious as a first application, but subsequently moist and mild antiseptics were found to be more suitable. The new treatment by ambrine is now officially provided.<sup>13</sup>

Shock, even in cases of slight injury, was found to be excessive, and for this reason immediate operations should be avoided (Muir). As a means of obviating shock morphine proved a sheet-anchor,  $\frac{1}{2}$  to  $\frac{3}{4}$  grain being injected hypodermically. The sublingual method of allowing tablets to dissolve under the tongue, which is convenient as it does not necessitate the presence of a medical officer—the tablets being served out by an executive officer—was not satisfactory. The administration of  $\frac{1}{4}$  pint of warm bovril containing 2 oz. of brandy proved beneficial in the *Tiger* in the Jutland Battle.

*Poisoning by gases from explosives.*—The detonation of shells such as lyddite and the burning of our own cordite liberate large quantities of CO and CO<sub>2</sub>, but the most powerful factor in the production of "gassing" is nitric oxide. The symptoms usually come on after a comparatively uneventful interval; and possibly during this incubation period the NO and NO<sub>2</sub> are oxidised into nitric acid (Symons<sup>14</sup>), which accounts for the acute irritant effects on the respiratory tract. Severe headache and vomiting are early symptoms, followed by cough, husky voice, dyspnoea and cyanosis which become progressively worse, rapid respirations reaching 80 or more per minute, restlessness, pain and tightness behind the sternum, orthopnoea, frothy, sometimes blood-stained expectoration, and oedema of the lungs. Prophylactic treatment is most important and quite effective; it consists in the immediate application of the Service respirator containing cotton-waste soaked in the usual soda solution. The respirator should be worn round the neck from the beginning of the action, so as to lose no time in putting it in position. The treatment of the declared condition is unsatisfactory. Though theoretically attractive, atropine does not appear to have been successful. Some benefit has been ascribed to brandy, the production of vomiting, and the repeated administration of spiritus ammonia aromatus in 1 oz. of water.

Cases of carbon monoxide poisoning occurred, and I had the opportunity of seeing three cases among men employed in putting out a fire in the bunkers of a collier. One of these presented curious nervous symptoms, resembling in some respects peripheral neuritis but more probably functional in nature, which persisted for two years.

Delayed pneumonia after immersion was noticed by Deputy Surgeon-General H. W. G. Doyne in some cases after the sinking of the *Cressy*, *Pathfinder*, and *Hermit*. Pneumonia occurred about three weeks after the immersion.

Appendicitis is not rare in the Navy in peace-time; before the war it occurred in about 0·2 per cent. of the personnel of the Navy. Since the war began it is impossible to give the percentage, but it is by no means uncommon. I am indebted to Surgeon C. J. G. Taylor, R.N.V.R., for figures which show a decided percentage increase in the incidence of appendicitis directly after the Battle of Jutland among the sick from the engaged ships. He also points out that there was a similar rise in the incidence of appendicitis directly after a sweep of the Fleet in the North Sea when contact with the German Fleet was almost established. On the other hand, when the Hospital Ship *Soudan*, in which

he served, was present at the opening stages of the Gallipoli operations, and the men were exposed to conditions of naval warfare, the incidence of appendicitis among 11,619 cases of wounds, sickness, and accident was low—viz., 0·2 per cent.

### III.—*The Royal Naval Division.*

The Royal Naval Division served in Belgium, Gallipoli, and is now in France under the Army. The Marines also fought on land in Mesopotamia. The naval forces have therefore been exposed to the same infections and diseases as the armies with whom they have been associated. The contrast between the incidence of disease in the Service afloat and the Naval Divisions on land is as striking as that between the conditions of naval and military warfare generally. Even if statistics were available, it would be impossible to deal fully with the diseases among the Naval Division in Gallipoli, as this would be equivalent to a consideration of military medicine, but a few points of interest may be mentioned.

As has always been the experience in war until quite recently, diseases due to infection through the alimentary canal—diarrhoea, typhoid, paratyphoid, dysentery, and jaundice—levied a heavy toll in Gallipoli, and a large number of men were invalided to this country.

Diarrhoea was so frequent that it was regarded as an incident rather than a cause of going sick, and a solid motion was the exception rather than the rule on the Peninsula; men might go to the latrines ten times daily for months without reporting themselves as sick. As it was common when sand-storms were prevalent, it was called sand diarrhoea, but it is probable that it was not entirely due to the purely mechanical irritation of the sand, but that the sand conveyed micro-organisms into the food, and that flies, which were a veritable plague at Gallipoli, may have played a carrier part in the infection of food.

Dysentery, the amoebic and bacillary forms being predominant at different periods, claimed many victims, but the treatment by emetine and antidysenteric serum gave very satisfactory results. Indeed, many cases of amoebic dysentery appeared to have been cured by the time they arrived in this country, and thus amoebic dysentery appeared, as judged by the observations in this country, to be less common than it was reported to be in the Eastern Mediterranean. Among 143 cases in 1916 in which Mr. H. A. Baylis found protozoa in the faeces, 29, or 20 per cent., showed *Entamoeba histolytica*. Emetine was freely given, and in some instances the question arose whether subsequent palpitation, breathlessness, arrhythmia, and precordial pain were due to the poisonous effects of the acute infection, excessive smoking, or the remedy emetine; for experimentally emetine has been found to produce ventricular fibrillation (Levy and Rowntree). It is interesting to note other bad effects of this successful drug—peripheral neuritis and chronic diarrhoea with or without blood which must be distinguished from a recurrence of dysentery. On the other hand, the freedom with which emetine was given may have been responsible for the rarity of hepatic abscess. Three cases of entamoebae in the urine with temporary vesical irritation, possibly due to rupture of a small pericolic amoebic abscess into the bladder, came under my notice. Urinary amoebiasis has apparently seldom been observed, as Scott Macfie<sup>15</sup> refers to 15 cases only.

Bacillary dysentery as judged by a series of late convalescent cases examined serologically by Dr. P. Fildes was found to be more often—in the proportion of 8 to 1—due to Flexner's bacillus than to Shiga's. This seems to be contrary to the general experience in Gallipoli, but the conditions of the acute infection in which the bacilli can be isolated from the faeces and of late convalescence when the agglutination reactions were performed are not really comparable. The diagnosis with which patients arrived in this country was often changed as the result of laboratory examination, and sometimes mixed infections were discovered. Among 481 cases which gave positive agglutinations pointing to bacillary infections of the alimentary canal examined at Haslar, some of which were multiple, Dr. Fildes found that 30 per cent. were due to *B. typhosus*, 23 per cent. to *B. paratyphosus A*, 20 per cent. to *B. paratyphosus B*, 22 per cent. to *B. dysenteriae* Flexner, and 0·3 to *B. dysenteriae* Shiga.

<sup>11</sup> Muir: Journ. Roy. Nav. Med. Service, 1916, II., 415.

<sup>12</sup> Maclean and Stephens: Ibid., 1916, II., 425.

<sup>13</sup> THE LANCET, 1917, I., 201.

<sup>14</sup> Symons: Journ. Roy. Nav. Med. Service, 1916, II., 516.

<sup>15</sup> Scott Macfie: Ann. Trop. Med. and Parasit., Liverpool, 1916, x., 291.

A large number of patients were invalidated home with intestinal symptoms clinically described as paratyphoid or dysentery which, however, could not be serologically or bacteriologically proved to be due to any known infection, and were therefore labelled by the non-committal term of "enteritis." The antityphoid inoculation was fully justified by results.<sup>16</sup> Much bacteriological work was necessitated in the testing of patients sent home for intestinal diseases in order to prevent the escape of carriers into the general population. The increase in the number of patients in the large naval hospitals due to this cause is shown by the peak on the chart during September and October, 1915.

Epidemic jaundice, apparently imported from Egypt, was very common in Gallipoli at the end of 1915. The degree of the jaundice did not run parallel with the malaise, for men considerably bronzed continued at work while others with but slight icterus were obliged to go sick. Its etiology gave rise to much discussion ; from the freedom of many patients from preceding gastro-enteritis (McBean Ross,<sup>17</sup> Hurst<sup>18</sup>) it seemed unlikely that it was catarrhal jaundice in an epidemic form. Similarly there was no evidence that it was due to dysentery or enteric fever. In some instances it followed these diseases, but usually after an interval as an accidental event. I have seen it develop in England in convalescent dysenteric and typhoid patients. The suggestion that it was due to paratyphoid (*B. paratyphosus dardanensis*) infection of the biliary system has not been substantiated. Hurst regards the disease as an acute infection of the duodenum by an organism allied to *B. paratyphosus A*, which should therefore be treated with the same precautions as enteric fever. The only necropsy that I have seen showed severe gastro-enteritis with a plug of tenacious mucus in the orifice of the biliary papilla. Dilatation of the heart was a definite feature, and peripheral neuritis (beri-beri) was noted as a not infrequent sequel. In one case under my care glycosuria followed the jaundice.

A form of peripheral neuritis identical with beri-beri in its clinical aspects occurred in Gallipoli and in Mesopotamia ; 12 cases of beri-beri were treated at the Royal Naval Hospital, Plymouth, in 1915-16, and at least 15 such cases at Haslar during the same period. In this outbreak the usual etiological explanation of beri-beri—namely, the absence of the specific vitaminine—presented difficulties ; but Wilcox,<sup>19</sup> who recognised that jaundice often preceded this beri-beri, supported the deficiency hypothesis of the disease by the explanation that the diet suitable for jaundice, diarrhoea, dysentery, and paratyphoid fever contains extremely little, and that tinned food is almost entirely devoid of the anti-beri-beri vitaminine which is destroyed by a temperature of 130° C. An ingenious hypothesis was put forward by A. F. Hurst, who revived Hamilton Wright's view that beri-beri is the result of a specific infection of the duodenum, the toxins produced by which exert a special action on the nervous system. As the epidemic jaundice in Gallipoli was regarded as the result of such a duodenitis, which, however, did not always obstruct the common bile-duct, the occurrence of this beri-beri-like neuritis after jaundice, or even without previous icterus, can be thus explained, and the necessity of relying entirely on a deficiency in vitaminines in the food is no longer binding. The dilatation of the heart and dropsy, which were marked features of some cases of beri-beri seen in Haslar, can thus be correlated with the dilated heart described in the epidemic jaundice.

Other fevers occurred in Gallipoli and Salonika, such as malaria, which was recently prevalent among the Royal Naval Air Service at Thasos and Cassandra in the autumn of 1916, both the forms of trench fever, and sand-fly fever. The value of anti-choleraic inoculation and of the efforts of the Health Department at the Dardanelles was shown by the freedom of the Royal Naval Division from cholera and plague, which Dr-puty Surgeon-General O. W. Andrews tells me were prevalent among the Turks in the immediate neighbourhood.

War nephritis and trench or Gallipoli sore, apparently analogous to the veldt sore in the South African War, and

due to a Gram-positive diplococcus (Archibald, Hadfield, Logan, and Campbell<sup>20</sup>), were also reported.

A considerable number of bullet wounds of the chest with resulting haemothorax were under observation at Haslar during the early part of the war, and as a rule were watched and not explored unless there was definite evidence of an embarrassing large infusion or of infection, and, though recovery was slow, the vast majority did well. This was in accordance with Makins's advice based on experience in the Boer War. In the present war the practice in the Army has been to tap sterile haemothorax except when small, and this course has not led to infection and has hastened recovery. In the trenches infection of a chest wound is much more prone to occur than was the case on the relatively sterile veldt.

#### DISEASES OF AIRMEN.

The chapter of aeroplane injuries and diseases—which from its interest may be briefly mentioned here—has been begun by Staff-Surgeon H. V. Wells.<sup>21</sup> From leakage of petrol spray the pilot may become dizzy, and the exhaust gases from the engine—carbon monoxide and dioxide—may cause headache, drowsiness, and malaise. The rarefied atmosphere at great elevations may induce the symptoms well known in balloonists, and Wells refers to a case of frost-bite in an airman who had been exposed to 34° of frost at an elevation of 15,000 feet. Psychasthenic symptoms—namely, loss of self-confidence and the resulting mental worry (aerothenia)—are not uncommon, and prove that the victim has mistaken his sphere of activity. Flying is undoubtedly the job of a young man under 30 years of age, and not every young man is temperamentally or physically fitted to carry it through. Perfect eyesight is necessary to ensure safe landing, correction with glasses being not without its dangers ; perfect hearing is essential to detect the first indications of engine defect, and free movement of the joints of the lower limbs to control the steering-gear. Fits and tendency to faint absolutely deter the aspirant from the air service. In one remarkable instance at Haslar an airman who fainted, with the result that the aeroplane dived nose downwards 1200 feet into a ploughed field, escaped with such minor injuries that he was at first extremely loth to give up this branch of the service.

#### ON THE PASSIVE IMMUNITY CONFERRED BY A PROPHYLACTIC DOSE OF ANTI- TETANIC SERUM.

BY A. T. MACCONKEY, M.B., B.C. CANTAB., D.P.H. ;  
AND  
ANNIE HOMER.

THE occurrence of cases of tetanus even though a prophylactic injection of serum has been given draws attention to the comparatively short duration of the complete passive immunity conferred by a dose of antitoxin. There are many references to this in the literature from 1893 (Roux and Vaillard) down to the present time (Vaillard, 1916), and yet this fact does not seem to be as fully recognised as it ought to be even now.

It has been stated that after a subcutaneous injection of antitoxin the antitoxin content of the blood reaches its maximum in 2-3 days and then remains fairly constant till about the seventh day, when it begins to decrease. It is also said that a sufficient dose of antitoxin gives complete protection for several days and partial protection for 2-3 weeks. The object of the following communication is to record some experiments which bear on this point. These experiments form part of a larger series which was undertaken with the object of ascertaining the most economical, and at the same time reliable, method of using tetanus antitoxin.

Our first object was to find out the smallest quantity of antitoxin which would give complete protection for one week. For this purpose several series of guinea-pigs were taken and each animal in a series received a subcutaneous injection of the same amount of antitoxin, but the number

<sup>16</sup> Vide Bassett Smith : Journ. Roy. Nav. Med. Service, 1917, III., 30.

<sup>17</sup> McBean Ross : Ibid., 1916, II., 317.

<sup>18</sup> Hurst, A. F. : Medical Diseases of the War, p. 104. 1917.

<sup>19</sup> Wilcox : Journ. Roy. Army Med. Corps, 1916, xxvii., 191 ; and THE LANCET, 1916, I., 566.

<sup>20</sup> Archibald, Hadfield, Logan, and Campbell : Journ. Roy. Army Med. Corps, 1916, xxvi., 695.

<sup>21</sup> Wells, H. V. : Journ. Roy. Nav. Med. Service, London, 1916, II., 65-71.

of units given to each series was different. Seven days later the immunised animals and a series of controls received an injection of tetanus toxin subcutaneously. The experiment was repeated until the results were quite clear, as may be seen in Table I.

Note.—To avoid repetition it may be stated that all injections were given subcutaneously in the abdominal region.

TABLE I.

Dose of toxin (U.S.A.)	Anti-toxin units.			Controls.			Anti-toxin units.			Controls.		
	3 $\frac{1}{2}$	7	10 $\frac{1}{2}$	3 $\frac{1}{2}$	7	10 $\frac{1}{2}$	1	2	3	4	5	6
0·000002 g	N	N	N	SI								
0·000003 g	M	N	N	..	Tet.*	..	N	N	..	N	N	..
0·000004 g	..	..	..		+4	..	+5	..		SI	SI	..
0·000005 g	..	..	..	Mi	..	..	+4	..	+12	..	Mo	..
0·000006 g	..	..	..	..	+4	..	+3	..	Mi	N	Tr	..
0·000007 g	..	..	..	..	+3	..	+3	..	SI	..	+4-5	

\* Tetanus, but recovered. N = Nil (no symptoms of tetanus). SI = Slight attack of tetanus. Mi = Mild attack. Mo = Moderate attack. Tr = trace. + = Death, and the number which follows indicates the day on which death occurred. Two numbers (4-5) refer to the night between two days.

We see that  $\frac{1}{2}$ , or  $\frac{1}{3}$  U.S.A. unit does not afford complete protection for one week, though these amounts saved life against a dose of toxin which was fatal to the controls. If, however, we give 1 unit or more we obtain complete immunity during at least one week. As an ordinary man is about 220 times heavier than these guinea-pigs, this would mean that, calculating by body-weight only, a man would require some 250 U.S.A. units to protect him for a week, while a dose of 500 U.S.A. units would allow for man being twice as susceptible as the guinea-pig.

It might be urged that the conditions of the experiment were not similar to those occurring in actual practice. In order to meet this objection an experiment was carried out in which each animal received a small dose of toxin some time before the serum and then further small doses of toxin at short intervals, until by the seventh day each animal had received a lethal dose of toxin (0·000006 g.). The results are shown in Table II.

TABLE II.

No. of animal.	Days—						Result.
	1	2	3	4	5	6	
1-5	0·000001g toxin	3 units of antitoxin	..	0·000001g toxin	..	0·000004g toxin	N
6-10	0·000001g toxin	10 A.M. 3 P.M. 6 units of toxin	0·000001g toxin	0·000001g toxin	0·000002g toxin	..	N
11-15	0·000001g toxin	9 units of toxin	0·000001g toxin	0·000001g toxin	0·000002g toxin	..	N

N = Nil (no symptoms of tetanus).

It is obvious that giving part of the toxin (1/6 of a lethal dose) before the serum has made no difference to the result.

If we increase the interval between antitoxin and toxin from 1 week to 10 days we find that the immunity is beginning to diminish, and if we wait 2 weeks before testing the immunity we obtain results which confirm those of previous observers and which show that most of the protection afforded by an injection of antitoxin has disappeared. There may, however, be a partial immunity sufficient to save life, though not to prevent an attack of tetanus. (Table III.)

TABLE III.—Immunity after 10 Days.

Dose of toxin.	Dose of antitoxin in units.				Controls.
	1	3	6	9	
0·000004 g	Trace for 4 days.	Nil.	Nil.	Nil.	Mild tet., recd., +5-6
0·000005 g	Nil.	S.L.T. for 3 days.	..	..	"
0·000006 g	S.L.T. for 1 week.	Mild tetanus.	+7-8 about 1 week.	S.L.T. for about 1 week.	"
0·000007 g					..

S.L.T. = slight local tetanus.

TABLE IV.—Immunity after 2 Weeks.

Dose of toxin.	Antitoxin units.			Controls.	Antitoxin units.			Controls.
	3 $\frac{1}{2}$	7	10 $\frac{1}{2}$		3	6	9	
0·000003 g	—	Slight.	Mild.	Slight.	—	..	..	K 13*
0·000004 g	+7	+8	+6	+6-7	Trace	+8-9	Mod.	..
0·000005 g	+7	Trace.	Slight.	+6-7	..	+7	..	+6
0·000006 g	Trace	..	+6	+6-7	K 5*	..	..	..
0·000007 g	Mild.	..	+8	Mod.	Trace	Slight.	..	+4-5

\* K 5 and K 13 = killed on fifth and thirteenth day respectively because of severity of the attack.

When the immunity has diminished so much in the course of a fortnight after an injection of tetanus antitoxin one is not surprised to find that practically all is gone at the end of three weeks.

TABLE V.—Immunity after 3 Weeks.

Dose of toxin.	Number of units of antitoxin.				Controls.
	1	3	6	9	
0·000004 g	+ 6-6	+ 7-8	Mod. tet. recd.	+ 8-9	Mod. tet. recd.
0·000005 g	+ 4-5	+ 4	+ 4-5	Mod. tet. recd.	+ 8-9
0·000006 g	+ 11-12	+ 4-5	+ 5	+ 5-6	
0·000007 g	+ 4	+ 3-4	+ 4-5	+ 5-6	+ ..

From these results it would seem that the increased dose of antitoxin has not had an appreciable effect in increasing the duration of the subsequent immunity.

In view of these results it seemed advisable to try whether a very much larger dose than had so far been given would give a correspondingly better result. Each of 5 guinea-pigs received beneath the skin of the abdomen 40 U.S.A. units of tetanus antitoxin, and after an interval of 2 weeks the test doses of toxin. (Table VI.)

TABLE VI.—Immunity 2 Weeks after 40 U.S.A. Units of Antitoxin.

Antitoxin.	Toxin.	Result.
40 U.S.A. units.	0·000003 g	No symptoms of tetanus.
"	0·000004 g	Mild tetanus from 5th to about 15th day.
"	0·000005 g	Trace of local tetanus 8th-16th day.
"	0·000006 g	"
"	0·000007 g	Mild tetanus from 7th to about 20th day

We see, then, that even such a large dose as 40 U.S.A. units (corresponding to at least 8000 units in man) does not afford complete protection for a fortnight. It would also seem that Levin (1909) was right when he expressed the opinion that we cannot hope by increasing the dose of antitoxin to increase greatly the duration of passive immunity.

These results led us to go a step further and to give an enormous dose, a dose which would allow us to compare our results with those of Ruediger (1913), who stated that 250 U.S.A. units of tetanus antitoxin would protect guinea-pigs for from four to six weeks against a dose fatal to the controls. Unfortunately, he does not mention whether the protection was complete or not. We gave to each of a series of guinea-pigs 250 U.S.A. units of antitoxin and tested their immunity at the end of four weeks. (Table VII.)

TABLE VII.—Immunity 4 Weeks After 250 Units of Antitoxin.

Antitoxin.	Toxin.	Result.
250 U.S.A. units.	0·000006 g	Mild tetanus—well within 3 weeks.
"	"	Moderate " — " "
"	"	" Slight symptoms. "
"	"	Mild attack—well within 3 weeks.

This large dose has protected, but not completely, though there was never any question of life being endangered. Now there happened to be available 13 guinea-pigs which had each received 10 c.c. of antitetanic serum in the ordinary course of routine testing. To each of these animals was given beneath the skin of the abdomen the official minimal lethal dose of the standard dry powdered test toxin which has been used in all the (previous) tests detailed in the paper. (Table VIII.)

A consideration of the results of these experiments fixes our attention on two points which stand out prominently.

The one is the extreme differences in the susceptibility of guinea-pigs to tetanus toxin; the other is the enormous doses which apparently we must give when we aim at obtaining passive immunity of long duration. Of course, it

TABLE VIII.

No.	Anti-toxin.	Interval between injection of antitoxin and of toxin	Toxin.	Result.
	U.S.A. units.	Days.	0·00000·6 g.	No symptoms of tetanus.
1	9000	27	"	Trace of "tetanus" present from 3rd-6th day and then passed off.
2	3000	27	"	Very slight symptoms; recovery.
3	3000	27	"	Very slight "tetanus. Death 21st day.
4	2200	31	"	Tetanus. Death 6th day.
5	2200	31	"	Slight "tetanus; recovery.
6	3000	40	"	Mild "tetanus; recovery.
7	3000	40	"	Only a trace; recovery.
8	3500	47	"	No symptoms.
9	3500	47	"	
10	3500	40	"	
11	3500	40	"	
12	3000	28	"	
13	3000	28	"	

would, in present circumstances, be quite impracticable to use for man doses corresponding to some of those we have given to guinea-pigs, and we must content ourselves with the smaller doses, even though the protection does not last as long as we would wish.

We have now to decide upon what is the best thing to do, knowing that we cannot count upon producing an immunity of long duration by the use of a single prophylactic dose of tetanus antitoxin. There are two ways of dealing with this question. On the one hand, we might, after giving the prophylactic dose, simply keep very careful watch for the first signs of incipient tetanus and then at once treat the case energetically. We have not noticed in the literature any suggestion that this course should be followed, though it is possible that as our knowledge of the disease and its early symptoms increases, it may turn out to be after all the best practice. On the other hand, we may repeat the protective dose with the object of keeping up the immunity. There is in favour of this latter view a large volume of opinion, much of it recent and based on experience gained since the war began.

Park and Williams (1914, p. 331) say that where tetanus infection is suspected the antitoxic serum should be given a second, or even third, time at intervals of seven days. V. Behring (1914) considers that if the infection of the wound continues the prophylactic dose should be repeated and antitoxin might also be injected locally.

Teutschländer (1915) goes so far as to recommend that as long as there may be tetanus bacilli in the body, then if thorough surgical treatment with removal of all foreign bodies—including their capsules when encapsulated—cannot be carried out, a curative dose of serum should be given whenever the temperature rises or there is any suspicious change in the condition.

Bazy (1916) is in favour of repeating the injections every eight days for a month. Among others who express opinions similar to the above may be mentioned Dubs (1915), Witzel (1915), Fraenkel (1915), Aschoff (1915), H. E. Robertson (1916), Kümmell (1916), Bérard and Lumière (1916), Montais (1916), and Capitan (1916).

Finally, we may quote from a communication made by M. Vaillard to the Academy of Medicine, Paris, on Sept. 5th, 1916, in which he says:—

"..... le Sous-Secrétaire d'Etat au Service de Santé a bien voulu me confier, de concert avec notre collègue M. Roux, l'examen des observations recueillies, pour en déduire les enseignements qu'elles comportent sur la prévention du tétonos. Les considérations présentées à la suite de cet examen lui ont inspiré une instruction en date 10 Juin, 1916; j'ai cru devoir les communiquer à l'Académie."

He mentions that the passive immunity conferred by a dose of antitoxin lasts only about 8-12 days, and that if toxin is still being produced in the body after this lapse of time there will be no antitoxin present to neutralise it, and then:—

"Si on contrarie la provision d'antitoxine est renouvelée en temps opportun, la préservation sera prorogée pour un nouveau laps de temps après chaque nouvelle injection. De là, pour certaines blessures particulièrement dangereuses, l'absolue nécessité de ne pas confier l'immunisation à une

seule injection préventive, et de réitérer ces injections tant que persiste la menace du foyer infecté d'où peut sortir le tétonos."

He then goes on to speak of late tetanus, and concludes:—

"De ces considérations on est conduit à déduire que les réinjections méthodiques de serum antitoxique fourniront un des moyens de mieux assurer la prévention du tétonos consécutif aux blessures récentes et d'étendre le même bénéfice aux périodes plus ou moins éloignées de l'évolution des plaies. Il serait regrettable que la crainte de l'anaphylaxie dont la survenance a été exagérée surtout à la suite des injections sous-cutanées détournât les chirurgiens d'une pratique judicieuse qui a fait ses preuves."

This question of anaphylaxis was brought prominently forward by M. de Massary before the Société Médicale des Hôpitaux de Paris in October, 1915, when he referred to the case of a soldier who was wounded and received an injection of serum. Wounded again a month later, he told the surgeon of the previous injection. Owing apparently to fear of anaphylaxis a second dose of antitoxin was not given. Five days later tetanus supervened and ended fatally.

The discussion which followed this communication ended in the appointment of a committee to inquire into the question of the effect of reinjections of serum. The committee was composed of MM. Achard, Aviragnat, Barbier, Chantemesse, Marfan, Netter, Siredey, and Louis Martin, who, after very careful consideration of the subject, drew up a report which was published in the *Bull. Société Méd. des Hôpitaux de Paris*, Nov. 19th, 1915, p. 1076, and which may be summarised as follows:—

They define a "reinjection" of serum as any injection which is made not earlier than 15 days after the previous injection.

*Intravenous reinjections*, they consider, should not be used as a routine measure, but be limited to cases of plague and grave tetanus, and above everything the injection should be made very slowly so that it can be stopped if necessary before much has been given.

Of *intraspinal reinjections* they say that it is impossible to give indications or contra-indications, for it is a surprising fact that in the same patient these injections are sometimes well borne and sometimes give rise to anxiety. The serum should be run in very, very slowly, and the needle left *in situ* for a time so that, should any disquieting symptoms occur, as much fluid as is necessary may be allowed to flow out again. When all fear of trouble is over the needle may be removed.

*Subcutaneous reinjections* are rarely followed by grave symptoms, and the risk of their occurrence cannot be compared with the risks run by the patient if a reinjection is not made. When there is urgent need for it the reinjection of serum should never be omitted owing to the fear of anaphylactic trouble.

Reinjections should not be given after a meal during the period of digestion, and should be given where the cellular tissue is very lax. They should be given slowly and stopped at the first sign of trouble. One should be doubly careful in the case of tuberculous subjects, asthmatics, those subject to urticaria, hay fever, or who are affected by various scents (e.g., smell of horses), or where there is any suspicion of purpura. In such conditions one should proceed very slowly with the first portions of the injection, one should stop at the slightest sign of anaphylaxis, and then, if all is well, begin again an hour or so later.

The final conclusion of the committee is that:—"Ou ne peut, dans aucun cas, reprocher à un médecin d'avoir pratiqué une réinjection de serum dans un but prophylactique ou thérapeutique."

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### A CLINICAL AGGLUTINOMETER:

AN APPARATUS FOR USE AT THE BEDSIDE OR IN THE LABORATORY FOR MAKING RAPID ESTIMATIONS OF THE AGGLUTININ TITRE OF THE BLOOD.

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CAPTAIN, R.A.M.C.

(Report to the Medical Research Committee.)

In the *Archives of Internal Medicine*, Dec 15th, 1910, C. C. Bass and J. A. Watkins describe "A Quick Macroscopic Typhoid Agglutination Test." In carrying out this quick test a drop of 1 in 5 dilution of blood is placed on an ordinary plain microscopic slide along with a drop of a specially dense (about 10,000 millions per c.c.) emulsion of *B. typhosus*. The two drops are mixed together on the surface of the slide, and made to move to and fro by gently rocking the latter for two minutes. A positive result is indicated if the emulsion is broken up into small white masses or clumps visible with the naked eye.

The technique about to be described is simply an elaboration of Bass and Watkins's method with the object of rendering it not merely a qualitative test for agglutinins in the blood, but an accurate quantitative estimation of the agglutinin titre of the blood. This object is attained by means of an apparatus which I have devised and called a "clinical agglutinometer."

The clinical agglutinometer consists of the following parts:—

1. *A diluting slab*.—A painter's palette made of glazed white porcelain having three rows of seven small cups, and a trough in which the saline solution is contained. (See Fig. 1.)

2. *Diluting pipette*.—An ordinary dropping pipette with teat.

3. "Standard"

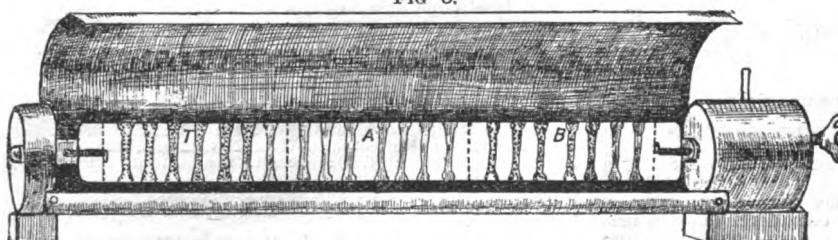
*platinum loop in handle*.—The loop is 3 mm. diam. and bent at a right angle with the stem of the wire.

4. *The agglutinometer slide*.—

A piece of ordinary clear glass 25 cm. long, 30 mm. broad, with smooth edges. It is divided by two lines crosswise into three equal parts. (See Figs. 4, 5, and 6.)

5. *Set of emulsion bottles in stand*.—The bacterial emulsions I have used in the agglutinometer are: *Bacillus typhosus* Eberth, *B. paratyphosus A* Brion-Kayser, *B. paratyphosus B* Schottmüller, *B. dysenteriae Shiga*, *B. dysenteriae Flexner*, *B. dysenteriae His*, *B. enteritidis Gaertner*, *B. faecalis alkaligines*, *B. coli communis*, *Vibrio cholerae* Koch, *Micrococcus melitensis* Bruce, *M. paramelelitensis*. The emulsions are made from 24-hour surface agar cultures. The growth is scraped off the surface of the medium in platinum loopfuls and emulsified in 0.1 per cent. formalin in normal saline. The emulsions used for this method should be dense ones—about 10,000 millions per c.c.

FIG. 3.



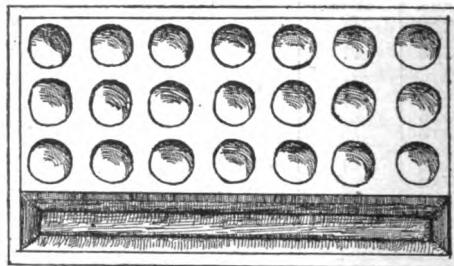
The density of all the emulsions should be uniform as far as the eye can judge. Each bacterial emulsion is contained in a small clear glass bottle with wide mouth, having a stopper bearing a "standard" platinum loop bent at a right angle with the stem of the wire. These platinum loops are in all respects the same as the platinum loop in handle. The most generally useful emulsions for diagnostic purposes are *Bacillus typhosus*, *B. paratyphosus A*, *B. paratyphosus B*, and *Micrococcus melitensis*. (See Fig. 2.)

6. *The mechanical mixer*.—This consists of a mechanical contrivance, by means of which the agglutinometer slide is

made to revolve on its long axis slowly (about ten revolutions per minute) in an atmosphere saturated with aqueous vapour. The moist chamber is a cylinder of celluloid placed horizontally, the upper half being jointed to form a lid, the lower half lined with filter paper soaked with water. The revolving movement is obtained by means of a simple clockwork attached at one end of the cylinder. It can be stopped at will by means of a lever (after the manner of a Dudgeon's sphygmograph). (See Fig. 3.)

7. *A pocket centrifuge*.—A small apparatus, not larger than a matchbox and weighing less than two ounces, for centrifuging the blood in Wright's capsules.

FIG. 1.



8. *Pocket lens*. Spirit lamp. Bottle of normal saline. Swabs of cotton-wool. Wright's capsules. Agglutinating sera.

*Description of Technique in the Use of the Clinical Agglutinometer.*

1. *The diluting process*.—(a) The blood for examination is taken from the lobe of the ear in the usual manner into a Wright's capsule, and centrifuged.

(b) By means of a dropping pipette (which during the whole process should be held vertically to ensure equality in size of the drops) place four drops of saline into cup No. 1 of the diluting slab and two drops into each of the other cups in the row.

(c) To cup No. 1 add one drop of the serum to be tested and mix

size of the drops) place four drops of saline into cup No. 1 of the diluting slab and two drops into each of the other cups in the row.

(c) To cup No. 1 add one drop of the serum to be tested and mix

thoroughly by drawing into and expressing from the pipette three times. This forms a 1 in 5 dilution of the patient's serum.

(d) Transfer two drops from the cup No. 1 to cup No. 2, and again mix thoroughly. This forms a 1 in 10 dilution.

(e) Again transfer two drops from cup No. 2 to cup No. 3, and mix thoroughly. This yields a 1 in 20 dilution, and so on to cup No. 7 (1 in 320 dilution).

2. *The mixing process*.—The process of mixing the blood serum and bacterial emulsions is carried out on the surface of the agglutinometer slide. The 25 cm. slide, divided by two lines into three segments, is long enough to take a triplicate series of the seven dilutions, so that the titre for T., A, and B emulsions can be found simultaneously.

Beginning with the highest dilution (1 in 320) loopfuls of the various dilutions of blood serum are deposited in triplicate on the slide which is lying flat on the bench. Opposite each loopful of serum is placed a loopful of bacterial emulsion, as shown in Fig. 4.

Equality in size of loopfuls can only be obtained by holding the handle of the platinum loop vertically throughout the entire process. Beginning with the highest dilution and passing towards the lowest, the loopfuls of serum and emulsion are mixed

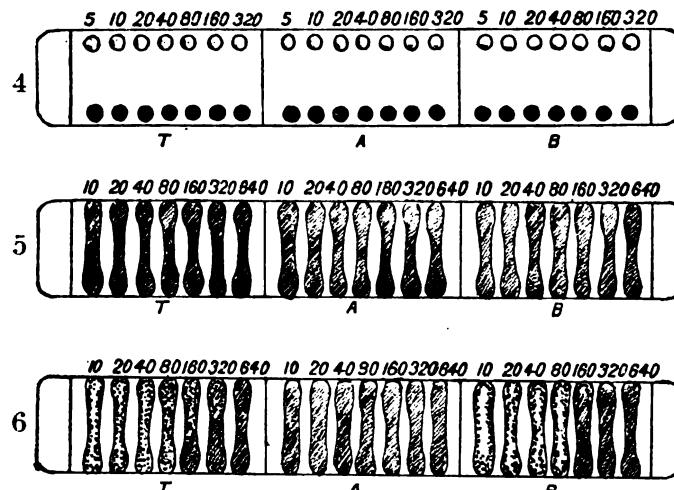
across the slide with the edge of the platinum loop. When this is complete there are on the surface, mixtures of bacterial emulsions of T., and A and B with blood serum in the following titres: 1/10, 1/20, 1/40, 1/80, 1/160, 1/320, 1/640. (Fig. 5.)

The slide so loaded is placed carefully in the moist chamber of the mechanical mixer where it is received and held fast by a clip at each end. The clockwork is started by means of the lever, and the slide allowed to revolve slowly for five minutes, during which time the mixtures run to and fro across the slide. The bulk of fluid is not enough to allow

the mixtures to run off the slide at the edges, nor for the various dilutions to run into one another.

At the end of five minutes the agglutinometer slide is removed and examined by the naked eye (aided, if necessary, by a pocket lens) in a good light against a black background. Agglutination converts the mixtures from homogeneous milky emulsions into a condition in which the agglutinated masses of bacilli float about like minute white flakes in a clear fluid. In a strongly agglutinating blood this takes place in the lower dilutions almost instantaneously after the agglutinometer slide begins to revolve. The change is very striking and can be easily seen with the naked eye. In the higher dilutions the change may take three or four minutes and be observable only with the aid of a pocket lens. If no change is visible with the pocket lens in the 1 in 10 dilution at the end of five minutes' time limit no agglutination of any diagnostic significance is present in the blood.

The diagram, Fig. 6, represents the appearance of the agglutinometer slide in the case of a patient whose blood agglutinates T. up to 1 in 320 and B up to 1 in 160, the A emulsion being negative.



(Note.—It is absolutely essential that the examination of the slide be carried out in a good light against a black background some distance away (say 3 or 4 feet), otherwise it is difficult or impossible to read the results.)

In examining the bloods of patients suffering from typhoid and paratyphoid infection it will frequently happen that all the dilutions up to 1 in 640 show agglutination. In such a case a further series of higher dilutions in the same geometrical progression is made, thus :—

(a) Into each of the cups in the second row on the diluting slab drop two drops of normal saline.

(b) Transfer two drops from the 1 in 320 dilution to cup No. 1 of the second row and mix thoroughly—this makes 1 in 640 dilution.

(c) Transfer two drops of 1 in 640 dilution into cup No. 2 of the second row and mix thoroughly, and so on to as high a dilution as it is considered necessary to reach the agglutinin titre of the blood. Now clean the agglutinometer slide with a cotton-wool swab wet with 5 per cent. carbolic, dry it, and flame it. Distribute the higher series of dilutions in platinum loopfuls on the slide in precisely the same way as for the lower series of dilutions, place opposite each dilution a loopful of emulsion, mix the two together across the slide, and place the slide in the mechanical mixer as before. The agglutinin titre of the blood is the highest dilution in which definite flakes of agglutinated bacilli can be seen with the aid of a pocket lens. It is, of course, essential that the dilution beyond this (the ultimate dilution) be absolutely negative. This indicates the penultimate dilution as the limit of the agglutinin titre of the blood and acts as a control for each test.

#### Theory of Action of the Agglutinometer.

For the purpose of explaining the action of the agglutinometer the phenomenon of agglutination may be considered to consist of two processes :—

1. The union of agglutinin with the agglutinable substance (whether this is in the nature of a true chemical union or is merely "adsorption" is here immaterial).

2. The aggregation of the bacilli into clumps. Both these processes are greatly accelerated by the movement to and fro to which the mixtures of serum and emulsions are subjected in the mechanical mixer. Different portions of agglutinin

and agglutinable substances are constantly being brought into contact with one another and their union facilitated. The same constant movement of a staining solution over a section of tissue or a blood film hastens the staining process and renders it more complete. For the same reason photographers use a mechanical rocker which causes the developing solution to move constantly to and fro over the photographic plate. The physical change—the aggregation of the bacilli into clumps—is also greatly accelerated by rolling the bacilli on one another. In the lower dilutions in which agglutinin is concentrated, agglutination appears instantaneously throughout the emulsions, but in the higher dilutions, in which agglutinin has been reduced to a mere trace, the clumps will be seen to form slowly along two lines which correspond to the junction of the quickly moving central stream and slowly moving peripheral stream on either side—that is to say, the position in which the rolling action on the bacilli is most marked. They tend to pass outwards into the peripheral stream and finally settle along the edge of the fluid.

#### The Uses and Advantages of the Clinical Agglutinometer.

**Simplicity.**—The technique is simple and easy. Little is left to the manipulative dexterity of the operator, and thus satisfactory results should be obtained by men with little experience of the method.

**Speed.**—The method is extremely rapid. After a little practice, specimens of blood can be examined and the results recorded at the rate of 10 per hour—an all-important consideration in war-time.

**Accuracy.**—The titre found by the agglutinometer in 5 minutes is the same on an average to within one dilution, as that obtained by the elaborate method in tubes in 2-24 hours. The end-point is as sharp as that in tubes and easily read after a little practice. The method is therefore capable of detecting with all sufficient accuracy those fluctuations in titre which take place during the course of enterica. The special sphere of usefulness of the clinical agglutinometer is in the making repeated examinations in those cases of clinical enterica after triple inoculation in which attempts at isolation of the bacillus from the blood, urine, and faeces have failed. Evidence is accumulating that in these cases this special method of examination gives valuable help in diagnosis at a small cost in time, trouble, and material.

The diagrams illustrating this article were kindly drawn for me by Captain Philip H. Bahr, R.A.M.C. This agglutinometer may be obtained through Dr. Thos. G. Nicholson, resident medical officer at the London Fever Hospital, Liverpool-road, Islington, London, N.

#### A SHORT NOTE ON

### THE EFFECT OF PYREXIA ON INOCULATION AGGLUTININS.

BY G. SELBY WILSON, M.B., B.S. LOND., M.R.C.S.,  
L.R.C.P. LOND.,  
TEMPORARY LIEUTENANT, R.A.M.C.

(From the Bacteriological Laboratory, Charing Cross Hospital.)

In consideration of the large number of results which have been published by Dreyer, Inman, and Ainley Walker, working by the macroscopic method on the one hand, and Tidy, working by the microscopic method on the other hand, in regard to the effect of pyrexia on the agglutinin content of the blood of those persons who have been previously inoculated with typhoid vaccine, and in view of the discordancy which has occurred in the conclusions which have been drawn from these two methods, it was suggested that it would be interesting to examine the serum of each individual patient by both the macroscopic and microscopic procedures. For this purpose a series of 97 soldiers and others, who had been inoculated within the preceding 20 months against typhoid fever, was taken, and the agglutinin titre of the

serum of each case was estimated in the manner already stated.

The technique of the experiments was as follows:—

The macroscopic method was similar to that employed by Dreyer, with the exception that the killed typhoid emulsion was not standardised, so that the results as here given cannot be recorded in terms of his agglutination units. Tubes were put up in the following dilutions of serum: 1 in 25, 50, 125, 250, 500, 750, 1000, 2500, 5000, and 7500. The end point was taken as occurring in that dilution in which agglutination was just visible with the aid of a small magnifying glass. Thus, e.g., if agglutination could just be seen in a dilution of 1 in 500, this was taken as the end point, but if agglutination was quite distinct in a dilution of 1 in 500, and was absent in a dilution of 1 in 750, the end point was taken as the mean of these two—namely, 1 in 625.

For the microscopic method an emulsion of bacilli was prepared from a 24 hours' subculture on agar, the same strain of bacillus being used throughout the whole course of experiments, both macroscopic and microscopic. Dilutions of serum were put up as 1 in 25, 50, 125, 250, and 500. The end point was taken as that dilution in which marked agglutination was present after half an hour's exposure at room temperature; this did not exclude the presence of a few motile bacilli. In case of doubt as to the exactness of the reading, an intermediate dilution was put up. Dilution was continued till no agglutination was seen, and this was found to be not greatly in excess of that in which marked agglutination was present.

The cases have been divided into three classes:—

*Class I.* contains those patients who subsequent to inoculation had run no temperature at all.

*Class II.* contains those patients who since their inoculation had run a temperature of 102° F. or more for at least four days, generally not longer than a week.

*Class III.* contains those patients who since their inoculation had run a temperature of between 100° and 102° for periods of over a week, in many cases lasting for several weeks.

A glance at the tabulated figures will show:—

1. That the average agglutinin titre of sera obtained from patients who have suffered from a febrile attack since inoculation is lower than that of those who have had no such attack.

2. That as regards the effect of pyrexia on the agglutinin titre there appears to be no appreciable difference between a short high and a long low temperature.

3. That in this respect the results as obtained by the macroscopic and microscopic methods, taken on the average, are very similar; thus the average dilutions in which agglutination occurred in *Class II.* and *III.* are practically half of those in which agglutination occurred in *Class I.*, as estimated by both methods.

4. That the relations in the individual cases between the two methods are extremely variable, the macroscopic method showing very marked agglutination in some cases in which the microscopic failed to demonstrate any at all. It will be noticed that the difference between the average results in the various classes cannot be due to a variability in time from the date of inoculation, for they all approximate to the same period of months.

5. That it is an obvious advantage when making repeated quantitative estimations to use a method which gives agglutination over a great range of dilution, since small differences are so much more easily recognised. Especially is this the case in dealing with the question of the diagnosis of typhoid in inoculated patients, when frequent examinations at short intervals are required.

Before drawing any conclusions from these figures it would be well to notice Tidy's statement in *THE LANCET* of Jan. 29th, 1916, to the effect that a temperature of 102° F. lasting for four days is apparently sufficient to lower the agglutinin content of the blood to such an extent that a negative reaction will be obtained; if, on the other hand, complete agglutination in a 1 in 50 dilution of serum by the microscopic method is present on the fifth day, the patient is probably suffering from an attack of typhoid fever. Now, were this the case, no fewer than 25.9 per cent. of the patients in *Class II.*, which consists of those who had run a temperature of 102° F. or over for four days or more must have been suffering from typhoid fever, whereas clinically they presented no symptoms or signs of such a condition, the great majority of the temperatures in the whole series of cases being due to septic wounds.

The results obtained were:—

*Class I.: 48 Cases.*

*Class II.: 27 Cases.*

Case No.	Months since inoculation.	Macroscopic: serum dilution 1 in—	Microscopic: serum dilution 1 in—	Case No.	Months since inoculation.	Macroscopic: serum dilution 1 in—	Microscopic: serum dilution 1 in—				
1	20	180	20	1	19	200	0				
2	19	3500	200	2	19	3750	100				
3	19	3750	100	3	19	85	0				
4	18	1750	20	4	18	750	0				
5	16	1750	50	5	18	1500	20				
6	16	85	0	6	17	750	0				
7	16	1750	100	7	17	375	50				
8	14	375	50	8	17	375	20				
9	14	750	20	9	17	1750	50				
10	14	750	0	10	16	375	0				
11	13	750	20	11	14	750	0				
12	13	3750	150	12	12	750	0				
13	12	350	0	13	11	750	0				
14	12	750	20	14	10	3750	250				
15	12	375	20	15	10	180	0				
16	12	25	0	16	10	750	20				
17	12	1750	20	17	10	3750	100				
18	12	1750	50	18	9	200	0				
19	12	1750	50	19	8	375	0				
20	12	750	0	20	8	200	0				
21	12	180	20	21	4	750	20				
22	11	1750	150	22	4	180	20				
23	11	85	0	23	2	1750	50				
24	11	1750	50	Averages: 11·6							
25	11	375	0	969							
<i>Class III.: 22 Cases.</i>											
26	10	3500	350	1	20	0	0				
27	10	1500	100	2	19	750	20				
28	10	1750	20	3	17	1000	50				
29	10	750	20	4	16	750	20				
30	9	3750	100	5	16	375	0				
31	9	375	20	6	14	85	20				
32	9	750	20	7	12	375	0				
33	9	1750	50	8	12	375	20				
34	8	750	20	9	12	375	20				
35	8	1750	20	10	12	375	20				
36	8	7500	300	11	11	3750	100				
37	8	1750	20	12	10	750	50				
38	7	1750	20	13	9	375	0				
39	7	1500	0	14	9	85	0				
40	7	1750	20	15	9	375	20				
41	7	1750	20	16	9	750	0				
42	6	3750	50	17	7	750	20				
43	6	1750	20	18	6	1750	20				
44	6	750	50	19	5	3750	100				
45	4	375	20	20	5	1750	50				
46	2	1750	50	21	4	750	50				
47	1	1750	100	22	1	1750	50				
48	1	1750	100	Averages: 10·5							
				1692							
				54							
<i>Conclusions.</i>											
1. That although comparison of the arithmetic mean of the various series suggests that the effect of febrile attacks is to lower the agglutinin titre, yet, in view of the comparatively small number of cases examined and the wide range of variation in the results obtained, it would be unsafe to draw any definite conclusions. In certain of the investigations already published a comparison has been made between such series of results on the basis of the value of the middle term of each series; it will be seen that such a method of comparison employed in the figures here recorded gives an entirely different result from that obtained by utilising the arithmetic mean, and this may be taken as further evidence that such series are not strictly comparable. It would seem, however, that the mean value offers the better standard of comparison, since a single high agglutinin titre affects to too great an extent the whole results if the middle term be employed. It may be concluded that such a series as the above offers only a suggestion that febrile conditions decrease the agglutinin titre, and more extended investigations must be awaited before a final judgment upon the subject can be passed.											
2. That persistence of agglutinins in the serum of a patient who has had a temperature of 102° F. for four days, whether estimated by the macroscopic or the microscopic method, is insufficient to justify a diagnosis of typhoid fever.											
3. That the macroscopic method suggested by Dreyer offers obvious advantages when repeated quantitative estimations of the agglutinin titre have to be made.											
I should like to express my thanks to Dr. W. W. C. Topley, at whose suggestion this work was undertaken, and by whose kindness I have been able to carry it out.											

### Conclusions.

- That although comparison of the arithmetic mean of the various series suggests that the effect of febrile attacks is to lower the agglutinin titre, yet, in view of the comparatively small number of cases examined and the wide range of variation in the results obtained, it would be unsafe to draw any definite conclusions. In certain of the investigations already published a comparison has been made between such series of results on the basis of the value of the middle term of each series; it will be seen that such a method of comparison employed in the figures here recorded gives an entirely different result from that obtained by utilising the arithmetic mean, and this may be taken as further evidence that such series are not strictly comparable. It would seem, however, that the mean value offers the better standard of comparison, since a single high agglutinin titre affects to too great an extent the whole results if the middle term be employed. It may be concluded that such a series as the above offers only a suggestion that febrile conditions decrease the agglutinin titre, and more extended investigations must be awaited before a final judgment upon the subject can be passed.
- That persistence of agglutinins in the serum of a patient who has had a temperature of 102° F. for four days, whether estimated by the macroscopic or the microscopic method, is insufficient to justify a diagnosis of typhoid fever.
- That the macroscopic method suggested by Dreyer offers obvious advantages when repeated quantitative estimations of the agglutinin titre have to be made.

## Medical Societies.

### ROYAL SOCIETY OF MEDICINE.

#### CLINICAL SECTION.

*Toxic Jaundice due to T.N.T. Poisoning.—Primary Carcinoma of Liver.*

A MEETING of this section was held on Feb. 9th, Surgeon-General H. D. ROLLESTON, R.N., the President, being in the chair.

Dr. R. MURRAY LESLIE showed a case of Toxic Jaundice due to T.N.T. Poisoning. The patient, a woman aged 28, after being engaged in handling T.N.T. for about 14 days, noticed that her hair, which was originally fair, had become of a "ginger" colour, but her general health did not suffer in any way, and she continued at her work for a fortnight after the change in the colour of the hair had been noticed. She remained quite well for one month after leaving her employment, although the ginger colour of the hair persisted. At the end of this time, however, she noticed that the skin of the face became yellow, and in about one week the skin of the whole body was similarly affected. This yellow colour gradually deepened, and she stated that the whites of the eyes became tinged later. A fortnight after the appearance of the jaundice she noticed a "cankery taste," lasting for about an hour after taking food. Afterwards she had occasional vomiting, which seemed to relieve the disagreeable taste, and during the same time suffered from diarrhoea—three or four loose and offensive motions daily, very pale in colour. During the same period the urine was very dark—something like the colour of "strong tea." A week before admission a rash broke out over the body. She thought she had lost weight. On admission the hair was of a peculiar ginger-yellow hue, while the skin of the face and body was markedly jaundiced, with similar icteric tinging of the conjunctivæ. There was also a raised erythematous rash—a sort of superficial dermatitis—affecting the skin of the arms, chest, back, abdomen, buttocks, thighs and legs, producing, in association with the jaundice, a curious bronzed appearance. This erythema was accompanied by some irritation. The bowels tended to be relaxed and the motions were of a pale pipe-clay colour, but there was no actual diarrhoea, which had been present during the previous fortnight. The urine was of a dark brownish-green colour, and contained bile salts and bile pigments, and also a slight amount of albumin. Acetone was also present during the first ten days, but was not found in subsequent examinations. The specific gravity was 1020 and the reaction acid. Blood, tube casts, leucin, and tryosin crystals were not found. The liver dullness seemed slightly reduced and did not extend quite so far down as the costal margin, but there was no definite pain or tenderness on palpation. The temperature on admission was 99° F. and the pulse 100. Her weight was 8 st. 6½ lb. For the first three days the patient remained *in statu quo* and was not obviously ill or distressed. On the fourth day after admission, however, she got much worse, and her condition gave rise to considerable anxiety. The temperature rose to 102°, and there was remittent pyrexia for the next five days, the evening temperature on the sixth day after admission being 103°. There were no drowsiness, convulsions, or other alarming nervous symptoms, and no actual distress. She was indeed bright and cheerful throughout. Acetone at this time was present in the urine. After a week's pyrexia the temperature fell to normal, and with the exception of occasional rises of temperature in the evening to 99°, and on one occasion to 100°, there was no pyrexia during the rest of the patient's stay in hospital. The erythema disappeared within the first 14 days. The jaundice persisted unchanged for the first three weeks and then gradually diminished. The albumin disappeared from the urine. During the first three weeks the patient lost 6 lb. in weight, which she regained in the next fortnight. There was complete amenorrhœa for three months. After her discharge from the hospital she remained well except for an attack of epistaxis and diarrhoea, but slight jaundice persisted. The presence of acidosis, in association with pyrexia, during the first ten days suggested the administration of alkalies. Half-drachm doses of bicarbonate of soda were given every two hours during the day for eight weeks, after which the

same doses were given every four hours. When the pyrexia subsided the patient was put upon ordinary diet, with an excess of carbohydrates. The alkaline treatment was suspended during the past month, but since the recent attack of diarrhoea and hepatic pain it had been resumed in drachm doses three times daily.

Dr. F. PARKES WEBER read a short paper on two cases of Primary Carcinoma of the Liver. The first was an example of "cirrhosis carcinomatosa," the neoplasm originating from the hepatic cells in a cirrhotic organ. In the other the growth was of the "massive" type, probably originating from the epithelial cells of small intrahepatic bile-ducts. Before death thrombosis of the whole of the inferior vena cava occurred.

### MEDICAL SOCIETY OF LONDON.

#### *Naval Medicine in the Great War.*

A MEETING of this society was held on Feb. 12th, Lieutenant-Colonel D'ARCY POWER, R.A.M.C. (T.), the President, being in the chair.

Surgeon-General H. D. ROLLESTON gave an address entitled "Naval Medicine in the Great War," which is published in full in our present issue.

Surgeon-General Sir ARTHUR MAY, D.G., R.N., spoke of the high standard of health in the Navy and paid a glowing tribute to the civilian medical men of all grades who had joined the Royal Naval Medical Service during the war. He especially emphasised the self-denial of the surgeon-probationers and the excellence of their services.

Dr. F. W. MOTT said that as regards mental trouble among soldiers he had found that usually there had been some antecedent condition of nervous instability. Shell shock also occurred in those of a temperamentally nervous disposition. He was interested in what had been said about nitrous oxide fumes, and had recently received a brain, preparations of which showed that there had been a profound effect upon the blood, the haemoglobin being probably converted into methaemoglobin. The speaker regarded the process of adaptation as the main factor involved. The state of adaptation was the barrier by which perceptions liable to arouse the primary instincts were prevented from arising in consciousness to their true significance. Once adaptation had failed, or a vivid perception had pierced through and succeeded in arousing the primary instincts, the path was laid open for succeeding ones of less strength, and the consequence was that the individual had to maintain his normal level against an ever increasing load of mental stress. By various psychological processes the eventual production of any one of the clinical types could be explained, each individual case, of course, depending on its special attributes. The development of the various conditions demanded time, and this was afforded by the special conditions of modern naval warfare—the long periods of purely routine work with a constant anticipation of real action. The remarkable feature was that the average man should be capable of adaptation to such a degree as to enable him to withstand such conditions over so long a period as he did. It would not be possible were it not that in the process of civilisation a number of secondary instincts had been produced which acted in opposition to, and helped the individual to overcome the promptings of, the primary instincts; these were the herd instincts, such as the instincts of duty, morality, &c., and the religious instinct. In a ship the close relationship between individuals necessitated by the confinement of space tended to the production of a specialised herd instinct, usually termed the morale. Where the morale was strong the individual was saved from a great deal of the mental stress to which he might be subject, and cheerfulness and confidence with mental stability resulted. It could safely be stated that the morale of our ships at sea had lost nothing of its high degree since the war began, long as the time had been and however unmentioned the task. The very small relative increase in the numbers of the cases was due to the decided difference between conditions of peace and of war and to the unpreventable inclusion of a few less constitutionally sound individuals in the greatly enlarged personnel of the service.

Dr. THOMAS BEATON, Temporary Surgeon, R.N., referred to the Neuroses and Psychoses of the Sailor at War. The number of cases of this description admitted to the Royal Naval

Hospital, Chatham, had steadily increased until, in the last quarter of 1916, the admissions were six times the average quarterly admissions in peace-time. The relative incidence to the total number of medical cases admitted, however, had only increased by 2 per cent. each year of the war. 60 per cent. of the cases showed conduct which could be termed insane, the remaining 40 per cent. consisting of the pure neuroses and the psycho-neuroses. The clinical types of insanity did not differ to any great extent from those observed in civil practice. General paralysis, which occurred to the extent of 5 per cent., almost invariably showed a marked dementia rather than any definite delusional state. Cases of non-systematised delusional insanity, which were the most common, had a tendency towards rapid recovery under the influence of hospital life and the removal of circumstance of stress. There was generally a condition of congenital defect underlying the delusional content. The types of neuroses differed to a certain degree from those occurring in civil life. True neurasthenia was very rare, whilst hysterical states, mutism, functional paralyses, &c., were extremely infrequent and only seen in cases of a previously hysterical nature. The majority of the cases were of a type bordering on the neurasthenic on the one hand, and on the obsessional case on the other, showing distinct mental aberration but little derangement of the general bodily condition. This condition, termed "psychasthenia" by the speaker, occurred in association with congenital mental deficiency in the youth and the young adult, with senile and atheromatous change in the middle-aged and old adult, and between those ages almost invariably followed on a period of especially arduous stress. The fact that mental disturbance was the main feature of the whole series of cases indicated that the cause would ultimately be expressed in psychological factors. The actual severity of the circumstances under which the conditions developed did not necessarily indicate the extent of the mental disturbance to be produced, but obviously bore an inverse ratio to the resisting power of the individual.

Dr. A. F. HURST said that overactivity of the suprarenal glands could account for a large proportion of the ordinary manifestations of fear and anger. These were in the nature of preparation for action, and if too prolonged exhaustion of the suprarenal glands (and possibly of the thyroid) occurred. This explained the low blood pressure met with after serious illnesses in soldiers, a pressure which gradually improved as the cases got better. There was an overaction of the thyroid and suprarenal together in cases of apparent hyperthyroidism, and the blood pressure was higher than one would expect with simple overactivity of the thyroid. With rest, bromide, &c., the pressure fell. The cases of tabes and general paralysis brought on by shock and strain improved so much by treatment that he had been almost tempted to send them back to service. This he ascribed to the fact that they were secured in a very early stage. For war-dreams he had found hypnotism very successful, even one treatment sometimes causing their cessation. It was important that it should be employed at night so that the patient could afterwards be left to sleep until morning. He regarded the doubtful intestinal cases met with in the Mediterranean as examples of true dysentery, for it had been his experience that in all cases in which mucus and blood were present in the stools, the amœbae were found. Large injections intravenously of serum had proved remarkably successful. Of the beri-beri cases seen, the majority had had jaundice and the remainder some gastro-intestinal symptoms. He favoured the view of Hamilton White that the jaundice was due to duodenal infection, which was followed by a toxic neuritis as in the case of diphtheria.

#### JOURNALS.

*Indian Journal of Medical Research*, Vol. IV., No. 2.—The first article in this number is a note on the tests for certain narcotic and anaesthetic drugs, by Dr. E. H. Hankin, chemical examiner to the Government of the United Provinces of Agra and Oudh. A recent Army Council Order restricts the sale of some of these drugs to soldiers, and as no tests were known, or at least generally known, for some of them Dr. Hankin is right in thinking that his "Note" may prove of service.—Mr. C. Strickland, travelling medical entomologist, Federated Malay States, contributes three papers, the first of which gives interesting observations on the epidemiology of malaria fever in the Malay Peninsula. The author advances what he terms an "epidemiological paradox"

—namely, that while on the alluvial coast-belt malaria is incident on proximity to undrained jungle, in the hills and mountains malaria would not appear to be so incident; conversely, health results on the flat coast if the jungle be felled and drained; in the hills, if land be cleared and drained, malaria becomes prevalent. This means, in Mr. Strickland's opinion, that *A. umbrosus*, which causes malaria on the flat coast-belt land, will not breed in the hills, and that *A. maculatus* and others which cause fever in the hills will not breed on the coast alluvium. Exactly why this is so is now being investigated, and will be reported upon in due course. This paper was laid before the Federal Council of the Malay States by command of His Excellency the High Commissioner, and is reprinted in the *Journal* by permission. In his second paper Mr. Strickland describes a new species of *Protanopheline* from Malaya—*Myzorhynchos hunteri*; and in his third article he gives a description of a new species of umbrosus-like anopheline from Malaya—*Myzorhynchos novumbrosus*.—Major Clayton-Lane, I.M.S., contributes an interesting report on an investigation into ankylostoma infection in 11,000 inhabitants of the Darjeeling district. This inquiry was made with a view to determine the amount of the infection present among these people and with the object of freeing them from the disease, as well as for the purpose of observing what effects this had upon the health and working efficiency of such persons. The investigation was conducted upon the coolies engaged in several tea-gardens. The results showed that 66·02 per cent. of those examined were infected by *Necator americanus*, the only kind of ankylostoma present in this part of India. Incidentally infestation by other parasitic intestinal worms was revealed, 67·68 per cent. having *Asoaris lumbricoides*. A further report upon his inquiry is promised by Major Clayton Lane at a future date.—The Gland-Index in Tuberculosis is the title of a paper furnished by Dr. A. C. Lankester, giving some results observed by him in the course of his special tuberculosis inquiry in India. It has been suggested that it may well be that the proportion of enlarged cervical glands, tuberculous in origin, may be sufficiently large to determine a true correlation between the percentage of children showing enlargement of these glands and the number of cases of phthisis in the community to which they belong. If such a correlation can be established then the examination of children in various schools would seem to afford a very ready means of measuring the degree of prevalence of tuberculosis in their homes, and thus a comparison of cities and districts with one another as regards prevalence of consumption might be instituted, as also of various social and religious communities throughout the country. In his inquiry Dr. Lankester examined over 900 children and found 29·49 per cent. with enlarged cervical glands, but he was forced to the conclusion that the gland-index method needs to be further safeguarded before it can be regarded as suitable for general adoption as a means of measuring tuberculosis prevalence; the method, however, is well worthy of continued investigation, and he hopes to have the opportunity of testing it again in several directions.—Major W. F. Harvey, I.M.S., contributes two papers, the first being entitled "Some Facts Relating to Birth and Marriage Rates among Brahmins" and the second "Birth Rates, Marriage Rates, Fertility and Proportion of Sexes at Birth among some Fighting Communities." Both of these papers are supplemented by statistical tables.—A note on the effect of inoculating rabbits with cholera vaccine prepared in various ways is supplied by Captain C. J. Fox, I.M.S., who undertook this work in order to ascertain the relative value of different kinds of cholera vaccine which would combine a high immunising power with a minimum of local and general reaction. This, it appears, was called for, as the cholera vaccine prepared by Professor Haffkine produced a severe general and local reaction. The results showed that from the point of view of agglutinative power the most effective immunising vaccine appeared to be a heated one without phenol; and from the point of view of efficiency combined with minimum reaction the choice appeared to be in favour of a carbolised vaccine.—Captain A. L. Sheppard, I.M.S., gives an account of his experiences of scurvy in Zhob, Baluchistan, discussing also the clinical characters and etiology of the disease. He found that the seasonal prevalence corresponded exactly in this district with food scarcity, especially of vegetables, fresh meat, and milk. He is, however, led to ask, Is scurvy entirely due to deficiencies of diet, or is this only a predisposing cause?

# THE LANCET.

LONDON: SATURDAY, FEBRUARY 17, 1917.

## The Medical Department of the Navy in the War.

THERE is always a pleasure in examining a great and complex mechanism, in seeing how it moves, and how the various parts have been adapted, each for its own purpose. Just such an insight into the working of that elaborate machine, the Medical Department of the Royal Navy, was given us by Surgeon-General H. D. ROLLESTON in his address to the Medical Society of London on Monday last, which is printed in the present issue of THE LANCET. Before the war the Navy included more than a hundred thousand persons in all ranks, but with the outbreak of hostilities its personnel was enormously increased—we believe that no official figures have been published but it is well known that there are now at least half a million men holding permanent or temporary positions within the Navy, a number that must be quite unprecedented in the navies of the world. With the expansion of the numbers of the Navy it was clear that the Medical Department must increase also, and at even a higher rate, for with active service the need for medical and surgical assistance undergoes enormous increase. Up to the present no great sea fight, commensurate with the size of the opposed fleets, has occurred, but there have been sick and wounded, amply sufficient in number to test the working of the elaborate arrangements which have been made for their care and treatment, and numerous enough also to show how wise the naval authorities have been to expand the Medical Service vastly in preparation for worse things.

The system which the necessities of war have evolved has been dependent on what may seem, until circumstances change the point of view, an excess of preparation, and herein lies the interest of the more striking points in Surgeon-General ROLLESTON's address. First, as to the staff. A large number of temporary surgeons were enrolled, and in addition ten consultants were appointed, most of them to serve in the main base hospitals, with pathologists to carry on their duties in the clinical laboratories. In addition to these a new rank of medical service was devised. In peace time the smaller ships, such as destroyers, are not provided with any real medical attendance. Some of the officers and men have a certain amount of knowledge of the administration of first-aid in emergencies, and such knowledge has been found in practice to be sufficient. Indeed, many of the destroyers for a great part of the present war have had no surgeon on board. To remedy this deficiency the Medical Department of the Navy has appointed medical students who have passed in anatomy

and physiology but have not passed their final examinations, and has called them surgeon-probationers. They have been given some training at Haslar and they have proved their usefulness on many occasions. The question of the transport of the sick and wounded has also received particular attention, as would be expected when the conditions of naval casualties are considered. Four naval ambulance trains have been provided, and carry the patients from the ambulance ships and the naval hospitals near the naval bases to the large naval hospitals at Plymouth, Haslar, and Chatham. An excellent plan has been devised by Sir JAMES PORTER and Staff-Surgeon A. V. ELDER by which the Service cot, in which the patient is brought from the ship, is fixed firmly in the train, so that there is no necessity for transferring him from a stretcher to a cot in the ambulance train; this must save an enormous amount of discomfort and pain. The present great speed of the units of a battle fleet makes it practically impossible for a hospital ship to keep in touch with the fighting ships during a battle, and, moreover, in the midst of a battle a battle-ship or cruiser cannot heave to for the purpose of transferring the wounded to the hospital ship, for that would be to expose the ship to the risk of a torpedo. The hospital ship can only come into use after the action has ceased, and this is the fact that has been kept steadily in view by those responsible for the organisation. It is difficult to give any exact statistics as to the proportion of killed and wounded in modern naval actions, for when several ships are sunk it cannot be said how many of the crews have been killed by the enemy's fire and how many drowned, but on the whole the proportion of killed has been high. The amount of shock in the wounded seems to have been great, and immediate operation is therefore to be avoided as far as possible, while for the relief of shock the value of hypodermic injections of morphia appears to have been proved. The Royal Naval Division have seen active service in Belgium, Gallipoli, and France, and therefore have been exposed to the same risk of disease and injury as the armies with which they have worked.

To turn from wounds in battle to the incidence of disease, the amount of sickness in the Fleet has been wonderfully small, less even than in times of peace. With regard to infectious diseases, the most striking and noteworthy point was the severity of measles amongst the Shetlanders both in the Fleet itself and amongst the reservists stationed on shore. In the Orkney Islands Dr. R. P. HEDDLE, of Kirkwall, states that measles may be entirely absent for 15 or 20 years, but when the disease does appear, though the children have mild attacks, the adults take it very severely and seem to be especially liable to have pneumonia as a complication. The good health of the men is doubtless to be attributed mainly to the isolation of the Fleets, so that the risks of venereal infection and alcoholic excess were reduced to a minimum, but some of the improvement must certainly be attributed to the lectures delivered by the medical officers to the crews, dealing with the dangers alluded to. The monotony of waiting for

actions which never appear to come was anticipated by the authorities. It has told, we believe, far more hardly upon the officers than upon the men, among whom it has been in great measure obviated by means of regattas, boxing competitions, and other entertainments. Cinema shows have also been very useful, and a scheme has been devised for circulating films between the various ships. Great credit must be given to the arrangements which have been made. It was, however, the Naval Division in Gallipoli which suffered most from sickness; dysentery, diarrhoea, typhoid, paratyphoid, and jaundice all caused a large amount of invaliding, as has been made clear in many communications to our columns. Surgeon-General ROLLESTON discussed in his paper many of the points in connexion with these diseases, and the conclusions which he drew, as well as his brief account of the diseases incident to the Naval Air Service, will be received with pleasure. Altogether the paper was wonderfully instructive and interesting, and showed the success of the organisation of the Naval Medical Service.

### Tuberculosis and the War.

A YEAR ago a symposium in the *British Journal of Tuberculosis* afforded an occasion to consider the treatment of tuberculosis and the effect of the war upon the methods of carrying it out. Active measures had already necessarily been much curtailed, but we pointed out the necessity of unremitting attention to the public health aspect, especially the conveying of infection from person to person in the close contacts of poorer city life must be avoided. Equally important we felt to be the treatment of the earlier stages of tuberculosis which are preëminently curable in the growing child. At that time the effect of war conditions on the tuberculous soldier himself was largely a matter of conjecture, but it seemed, at all events, probable that the healthy outdoor life with abundant food and exercise in the fresh air was meaning for the sometime industrial worker an improvement in his chance of keeping the upper hand in a personal struggle with the tubercle bacillus. A year has passed away and the effect is still conjectural, but there are certain indications as to the directions in which progress may be looked for, and another symposium in the *British Journal of Tuberculosis* affords at the moment valuable information.

Taking first the tuberculous soldier, it is evident, we think, that camp and trench life has not been productive of more breakdowns than would have occurred in civilian employment. Dr. T. D. ACLAND, in a contribution to the symposium, quotes Mr. TENNANT'S statement in the House of Commons that up to March 1st of last year 2770 tuberculous soldiers had been discharged from the Army. It is a matter of common knowledge how reckless was the admission to the Army in the early days of men with clinical signs of tuberculosis, and the number of such will, of course, only amount to a tithe of those with latent or hardly recognisable disease.

It is amazing that in a citizen army running to millions the incidence of breakdown from tuberculosis all told should have been only in the lower thousands. A rough calculation of breakdown from the same cause among the men of military age in industrial occupations would give a vastly higher total. This stands out as an encouraging factor in a vastly perplexing situation, and we reiterate the hope we expressed a year ago that the accustoming of the industrial population of this country to a habit of open-air life may be a permanent health asset in the future. With regard to the treatment of the discharged tuberculous soldier, Dr. ACLAND notes the fact that nearly one-half of these 2770 unfortunates had not received a pension. We have already commented on this glaring inequality of treatment, and we believe that the present Pensions Minister will not be content to allow its continuance. Now that for six months the Recruiting Boards have been categorically forbidden to take into the Army men who have been under treatment in a sanatorium or been notified as suffering from consumption, all men discharged from the Army suffering from tuberculosis must be regarded as having contracted their disability, if not their disease, during service, and should in justice be put in the way of earning their living again. No rigid scheme of pensions will cover these cases in common with the cases suffering from other physical disabilities. Dr. J. LUMSDEN tells us that as far as Irish soldiers are concerned they have probably all been offered sanatorium treatment before discharge from the Army but have generally refused such treatment. Dr. ACLAND holds that the sanatorium treatment should be voluntary and preceded by a period of furlough, but the chance of refusal and the discouraging experience of giving furlough to men discharged from military hospitals before entering convalescent camps are weighty reasons against it. Dr. LUMSDEN therefore would retain the tuberculous soldier in the service, compel him to go to a sanatorium, and not discharge him until he should be in a condition to take up work, suggesting an agricultural colony as an aid to the solution of the problem. We may remind our readers that Dr. E. H. R. HARRIES, whose contribution to the problem of the tuberculous soldier we published in THE LANCET of Dec. 2nd last, came to much the same conclusion from his study of more than 100 soldiers admitted to the Beechwood (Newport, Mon.) Tuberculosis Hospital for Soldiers. Dr. HARRIES summarised his points thus: (1) That sanatorium accommodation would be of much greater value if discharge from the Army were deferred; (2) that it should be followed by a further period of some months on a farm colony.

Light also is dawning on the general question of the treatment of tuberculosis in civil life. Even before the war it was beginning to seem impossible to lodge and feed at the expense of the National Insurance or other funds all the bearers of a chronic pulmonary lesion. Now, under the financial stress and lack of personnel due to the war, local authorities all over the country are failing to cope with their legal obligations to the chronic consumptive, and tuberculosis dispensaries have long, often

impossibly long, lists of patients waiting to go into sanatoriums. But the chronic case is not a responsive occupant of sanatorium beds, and the results do not seem to justify his preponderance there. A report just received by the North Riding Insurance Committee is typical of many others. Dr. D. DUNBAR assures the Committee that only about 5 per cent. of the inmates of the Aysgarth Sanatorium are permanently benefited, and it is becoming clear that sanatorium treatment in the strict sense is not even necessarily the best treatment for the chronic consumptive. Belief is steadily gaining ground in the increasing value of dispensary treatment at the hands of an expert tuberculosis officer and of domiciliary treatment by the panel doctor when the advice and collaboration of an expert are available. The Local Government Board evidently had this in mind in the recent issue of the Order for domiciliary treatment, which came into force at the beginning of this present year. This value is strikingly brought out by Dr. HENRY A. ELLIS, who relates in the same issue of the *British Journal of Tuberculosis* his favourable experiences of dispensary work in a large northern manufacturing town, contrasting them in frank surprise with his previous work at Coolgardie, in Australia, under vastly better conditions of fresh air and climate. He notes that for the working population surprisingly little increase of care is sufficient to re-establish their normal powers of resistance, and he is driven to the conclusion that the rigour of a scientifically directed tuberculosis treatment may be materially modified and reduced in most early cases in favour of a carefully conducted supervision of home conditions. Opinions supporting a similar view are expressed in the symposium by Dr. G. A. CRACE-CALVERT, who holds that the real treatment comes after the sanatorium when the patient has returned to home and work, and Dr. CECIL WALL, who emphasises the necessity for provision of satisfactory living conditions for those who have left sanatoriums and for laying more stress on the common-sense adaptation of their limited output of physical energy in the pursuit of a livelihood.

How real is the Scottish awakening to the dangers of tuberculosis is well illustrated by two occurrences in the House of Commons this week. A Supplementary Estimate for £27,000 has been laid before the House for the treatment of tuberculosis in Scotland, while a University Court Ordinance has been presented for the foundation in Edinburgh of a Chair of Tuberculosis.

#### THE LANCET, VOL. II., 1916: THE INDEX.

OWING to the continued shortage in the paper-supply the Index and Title-page to the volume of THE LANCET which was completed with the issue of Dec. 30th, 1916, have been printed separately, and copies have been supplied gratis to those subscribers who have intimated to us their wish to receive them. Other subscribers will be similarly supplied, so long as the stock remains unexhausted, on application to the Manager, THE LANCET Office, 423, Strand, London, W.C. Such applications should be sent in at once.

#### Annotations.

"*Ne quid nimis.*"

#### THE NEW YEAR HONOURS.

THE list of honours issued at the beginning of the year was a small one, and included the names of no medical men in their civilian capacity. A supplementary list issued early this week by the Prime Minister includes the names of Dr. Robert Armstrong-Jones, consulting physician on mental diseases to the Military Forces in London, who has received a Knighthood; Dr. Arthur Newsholme, C.B., Chief Medical Officer to the Local Government Board, who has been promoted to a Knighthood in the Order of the Bath; and Sir Robert William Burnet, physician to His Majesty's Household, who has been made a Knight Commander of the Royal Victorian Order. In the Foreign Office list appear the names of Dr. John Warnock, Director of Lunatic Asylums, Egypt, and Dr. William A. Betts, Director of Municipal and Local Committees of Egypt, both of whom have received a C.M.G. We offer these gentlemen hearty congratulations. Well-deserved honour has also fallen to Mr. E. M. Clarke, head of the motor ambulance department of the Red Cross, and to Mr. J. Grice, a well-known philanthropist and chairman of the Melbourne Hospital, who have received knighthoods; and to Mr. J. G. Griffiths, honorary secretary of King Edward's Hospital Fund for London, who has been promoted a C.V.O. Mr. L. J. Otter, Mayor of Brighton from 1913 to 1916, played a leading part in connexion with the war charities of the town, and his Knighthood is thoroughly well earned.

#### A RARE FORM OF WAR NEUROSIS.

THE latest number of the *Nouvelle Iconographie de la Salpêtrière* (No. 1, 1916-1917) contains a well-illustrated article by Madame Rosanoff-Saloff on a curious and uncommon condition supervening in certain neurotic subjects as a result of war trauma, mental or physical. This consists in a marked spinal curvature in an anterior direction, so that the patient comes to resemble the "Man with the Muck-rake." Similar cases have been also observed in this country. With this prominent anterior flexion of the trunk there is occasionally seen a lateral inclination. Dr. Souques, of the Hospice Paul Brousse at Villejuif, in whose neurological service the cases have been observed, proposes the term "camptocormia" for the condition, from καμπτω to bend, and κορμός the trunk. From the clinical point of view the attitude of the patient is identical with an anterior flexion of the trunk in a normal individual; in all cases, however, he exhibits transverse skin folds on the back of the neck from an effort to hold the head up and so augment the visual field and facilitate walking. The abdominal muscles can be seen to be strongly contracted underneath the skin. As a rule, most movements of the trunk can be executed with comparative ease, except that of extension or posterior flexion, an effort to perform which often results in a typical generalised tremor of the lower extremities. On the other hand, the majority of the cases can lie flat on their back in bed, and this dorsal decubitus is not even painful. If the patient, further, is put on his face in a recumbent position he can on request raise his head, showing that extension can in reality be

performed. As a fact, the spinal column is supple enough, nor is there any evidence of local vertebral pain or sensitiveness, with the exception of that produced by pressure and palpation of the lumbar musculature on either side. No other abnormality of the nervous system is found, while radiographic examination is invariably negative. The cerebro-spinal fluid is normal. Madame Rosanoff-Saloff has examined some 16 cases of this neurosis and divides them into two categories—those with actual wounds and those without. Only two of the series belonged to the first of these groups, and in them the wounds were far removed from the seat of the abnormal flexion. The great number of the other group occurred in soldiers who had been blown up by a shell or buried, with a loss of consciousness of variable duration. Occasionally actual lumbar ecchymoses were noted. In all the earliest symptom was lumbar pain, violent and continuous and aggravated by movement. From the point of view of pathogenesis it may be mentioned that the sole position of comparative comfort adopted voluntarily by such patients is that of bending the body forward till the head is between the knees. After some weeks of gradual relief from the pain they declare that they cannot get their back straight again, and all sorts of local treatment are as a rule unavailing. The persistence of the attitude is explained by the fact that the subjects of the affection are without exception neuropaths. The normal subject cannot adopt such forced positions for long because of their discomfort, whereas the neuropath maintains the attitude from ideational inertia or from auto-suggestion. Madame Rosanoff-Saloff states that the prognosis is perfectly good provided the patient is removed from the surroundings of the ordinary hospital, where little or nothing is likely to be done to combat the peculiar mentality on which the neurosis is erected. She pleads earnestly for the removal of such patients to special neurological centres at the front itself (*dans la zone des armées*), where appropriate medical treatment with rigorous military discipline soon effects the best results. The suggestion is made to place the patient in a plaster jacket, with or without an anaesthetic, keeping it in position for 8, 10, or 15 days. This treatment, coupled with an atmosphere that of itself suggests cure, and proper discipline, succeeds without fail, according to Madame Rosanoff-Saloff's experience. We find ourselves in entire agreement with the proposal that these and analogous cases should be treated at the front, in a military-medical environment, and not allowed the chance of becoming perpetuated by wandering from one hospital to another at home, where it is a mere chance they may meet with a physician who is sufficiently interested or leisured to devote himself to a cure. As Charcot said, "il ne faut pas laisser flâner les contractures hystériques."

#### THE WORK OF THE BELGIAN WAR REFUGEES COMMITTEE.

AMIDST the chaos of passion which war produces the organisation of charity has been particularly noticeable since the commencement of hostilities, and in no way more so than in the attempts to relieve the Belgian sufferers. When, by the ruthless destruction of Belgian towns, thousands of children, women, and men were rendered homeless and sought succour and shelter in this country, offers of help came from all parts and from all

classes, and in London so great was the demand to be of service that at one time the number of volunteers for work outnumbered that of the refugees. The report of the War Refugees Committee dated August, 1916, has just been issued, and tells the story of an organisation carried out under the greatest difficulties which has provided wholly or in part for some 200,000 out of probably 250,000 Belgian refugees who have entered this country since the beginning of the war. At the end of 1914 there were 2000 local committees engaged in the work, though this number has since been decreased to 1837. The offers of hospitality received by the various local committees made provision for some 150,000 people, while up to February, 1915, the Board of Trade Labour Exchanges had found work for 8752. The health department, which deals with hospital and convalescent treatment, maternity cases, the provision of surgical appliances, and the investigation of consumptives, has ministered to 2550 cases, the weekly average of new cases being 45. At the dispensary, which is managed by a committee of English and Belgian doctors assisted by a Voluntary Aid Detachment, 20,852 patients have received attention and 14,243 prescriptions have been dispensed at an average cost of 4d. per head. The domiciliary visits made numbered 550, the surgical appliances provided amounted to 518, and 2200 letters of recommendation to hospitals and other institutions were procured.

#### SHELL WOUND OF THE PREGNANT UTERUS.

UNDER the title "Cæsarean Section due to a Shell Fragment," MM. Saint, Goehlinger, and Poiré have described a remarkable injury due to the war of a kind which, fortunately, we are spared in this country. A woman, aged 33 years, in the sixth month of pregnancy, was taken to hospital. She lived in a town behind the British lines which was daily bombarded. While seated at her window a shell exploded in the street and wounded her in the lower abdomen. She was admitted three hours later. The abdomen was distended and a reaction of "peritoneal defence" was already marked on the right side. The uterus extended two finger-breadths above the umbilicus. The position of the foetus could not be ascertained by palpation because of the pain produced by examination. There was a wound of entry a little below and to the left of the umbilicus and one of exit 9 cm. away, two finger-breadths above the left crural arch. From each wound omentum projected. On palpation it was evident that the abdominal muscles were completely divided and that between the two wounds only a bridge of skin remained. Blood was abundantly escaping from the vagina. A digital examination was not performed. The pulse was 110 and good, and the general condition satisfactory. Operation was decided on. The bridge of skin between the wounds was divided and the usual median incision for laparotomy made below the umbilicus. This with the wound due to the injury itself gave a large triangular flap with its summit at the umbilicus. A wound in the fundus uteri, 5 cm. long, was found running from the middle line downwards to the left and forwards. Amniotic fluid and meconium were free in the pelvis. Without separating the edges of the uterine wound the lumbar region of a foetus could be seen on which a small wound was visible. A median incision in the uterus allowed a flap similar to that in the abdominal wall to be detached

and the foetus and placenta to be removed. As the foetus was thought to be dead attention was confined to the mother. The uterine cavity was cleaned out, the haemorrhage arrested, and the uterus sutured. After rapidly examining the coils of intestines the abdominal wounds were closed. At this moment the foetus, which had been left in a basin, began to cry. It was a female weighing 950 grammes and had a superficial wound 2 cm. long in the left sacro-lumbar region. After a warm bath the child was enveloped in cotton-wool, but only lived for 15 hours after the injury. The mother recovered without untoward incident. Evidently the gravid uterus prevented deeper penetration of the shell fragment into the abdomen and perforation of the intestine. The presence of the foetus may be held to have saved the life of the mother.

#### RESTRICTIONS ON THE USE OF MEDICINAL GLYCERINE.

THE Ministry of Munitions announces that owing to additional demands for glycerine for war purposes it has become necessary to place further restrictions on the issue of medicinal glycerine, and that supplies in future will be reserved for the manufacture of the preparations of the British Pharmacopoeia, and for such uses of special importance as may be sanctioned by the Ministry of Munitions. These supplies will, however, be small and must be used with the utmost economy. Applications for permission to obtain supplies should be addressed to the Director of Propellant Supplies, 32, Old Queen-street, Westminster, S.W., and should give the following particulars: 1. Quantity applied for. 2. Stock of glycerine held. 3. Purpose for which supply is required. (In case of Extra British Pharmacopoeia preparations formulae should be given.) 4. Applicant's average yearly consumption of glycerine for above purposes. 5. Name and address of proposed suppliers. The medical profession have been informed of the need for economy in prescribing glycerine, and it is anticipated that the requirements for dispensing will be greatly reduced. The stocks of glycerine in the hands of pharmacists should be sufficient to meet these reduced requirements, and therefore no glycerine will be issued for dispensing meantime. The surplus stocks held by pharmacists, and all stocks held by retailers who are not in a position to use them for these restricted purposes, should be disposed of either to other pharmacists who are short of stock or to wholesale houses for making B.P. preparations. We published a note last week on the importance of economising glycerine for medicinal use, and there can be little doubt that in many cases it can be replaced for dispensing purposes, without material disadvantage, by other substances.

#### THE DRESSING OF BURNS WITH PARAFFIN WAX.

Sir Arthur May's prompt application of the remedy to the requirements of the Navy has drawn fresh attention to the treatment of burns by a proprietary preparation called ambrine by its inventor, Dr. Barthe de Sandfort. As, however, the preparation is a secret one controlled by a company in Paris, the treatment is not as readily accessible as some of our correspondents desire. We can refer these to the experience of Lieutenant-Colonel A. J. Hull, R.A.M.C., who stated in the *British Medical*

*Journal* of Jan. 13th that the results obtained by a mixture of home manufacture in a military hospital have surpassed those obtained by the use of ambrine or any other preparation. He gives the following formula for its preparation:

Resorcin	1 per cent.
Eucalyptus oil	2 "
Olive oil	5 "
Soft paraffin	25 "
Hard paraffin	67 "

The hard paraffin is first melted and the soft paraffin and olive oil are stirred in. The resorcin is next added dissolved in half its weight of absolute alcohol, and finally the eucalyptus oil when the wax has cooled to about 55° C. If necessary, the resorcin may be replaced by a quarter of its weight of β-naphthol. Colonel Hull adds that the application of this No. 7 paraffin, as it is called, to ulceration following frost-bite has been as successful as in the case of burns. Other uses will doubtless suggest themselves for a soft impervious casing to wounds which can yet be readily peeled off without pain or disturbance to the delicate processes of repair.

#### BORIC ACID IN CREAM.

IN our issue of Oct. 28th, 1916, we referred to the Amending Order issued by the Local Government Board in regard to the use of preservatives in cream. The Order, as is now announced by the Local Government Board, comes into operation on April 2nd next. It temporarily forbids an addition of boric acid to cream of more than 0·4 per cent., but a small expert committee is to be appointed to inquire further into the desirability of using boric acid at all. In the meantime dealers are asked to make every effort to reduce the preservative to the smallest possible amount; or even to dispense with its use entirely. Until the results of the promised inquiry are known all prosecutions will be avoided in respect of the sale of preserved cream which complies with the Regulations as now amended. Further restrictions may possibly be made dependent upon the findings of the committee referred to. Instructions are issued as to the form of label which such preserved cream must bear. The presence and amount of boric acid must be declared, and the words "Not suitable for invalids" are to be added. A similar provision applies to the use of peroxide of hydrogen as a preservative, except that the amount present is not demanded to be stated.

#### THE SCIENTIFIC STUDY OF HYDROLOGY.

Dr. Fortescue Fox's paper on "The Future of British Spas," read last week before the Royal Society of Arts, was in effect a plea for the scientific study of physical remedies. He reminded his audience of the memorial laid before the University of London a few days before the outbreak of war, recommending the establishment of a University chair in medical hydrology and medical climatology, a proposal which was still before the Senate. Systematic teaching regarding the action and uses of waters of every kind, both within and without the body, is now available in other European countries. An institute of hydrology has recently been attached to the Collège de France. And it was the opinion of the memorialists in 1914 that authoritative teaching should be provided in London, as

the capital city of an Empire rich in climatic resorts and medicinal waters, for senior students and practitioners likely to specialise in this branch of practice, as well as for medical men who came from the country or from distant parts of the Empire. Laboratory facilities for research work upon British soil are also desirable. These considerations, already urgent in peace, had gained, Dr. Fox alleged, in weight and force from the experience of the war. He alluded to the place which physical remedies were taking in the restitution of disabled soldiers, and pictured a further extension of highly specialised forms of treatment. But where, he queried, were the specialists to be found? The "whirlpool bath" has found wide use for stiff and disabled limbs, and the success of the large "sedative pool" bath has been considerable in disordered action of the heart; but it is a mistake to suppose that one or two methods are applicable to all conditions, and the need of trained men who have studied the principles and practice of hydrological medicine is an immediate one. With Dr. Fox's views, as we have summarised them, we are in substantial agreement. The command depôts up and down the country are already giving striking ocular demonstration of the value of hydrological methods when dealt with on a scientific basis. The war has given a much-needed stimulus to this study, and the results will doubtless remain as a permanent therapeutic asset. Our British spas with their cool and bracing climate may well offer our friends across the Channel, as Dr. Neville Wood pointed out some years ago, a pleasant and healthful change from the heat of the continental summer. Well equipped with scientific practitioners of the whole art of applying water, they should offer a great and increasing attraction.

#### TYPE-READING BY SOUND.

AT the Röntgen Ray Society on Feb. 6th Dr. Fournier d'Albe demonstrated before a large audience an instrument which he has named an optophone, whereby, with practice, blind persons are, he says, enabled to read ordinary print by sound. The instrument depends upon an application of selenium, and before describing it the demonstrator dealt in a general way with the properties of selenium itself, which was discovered exactly a hundred years ago by Berzelius. He instanced many ways in which this substance had been turned to more or less practical account. It has been employed in photometry, in the release of automatic shutters in cameras, in multiplex telegraphy, in phototelegraphy (the transmission of photographic images across the wire), in the photographophone (in which cinematographic images and sounds are synchronised), in television, and in the automatic regulation of lights, signals, and buoys. The optophone, in which Dr. d'Albe is apparently most interested, is an instrument which he devised first in 1912 to enable sightless persons to locate bright lights or brightly luminous patches by means of the ear and to discover shadows intercepting the light. This result was obtained by placing two selenium preparations into two arms of a Wheatstone bridge, sending a galvanometer current through the telephone and interrupting it by a clockwork motor. The lecturer explained that the work had been delayed since the war began because of the impossibility of obtaining Nernst filaments, which

were essential because they gave an intense line of light; but he added that he had now found that the half-watt lamp was available as a substitute. A small, revolving, perforated disc is illuminated by the lamp, and the image of a line of luminous dots, furnished by this revolving disc, projected upon the type to be read; the light thus reflected from the type is passed to a set of selenium bridges connected by a telephone relay, and sounds corresponding to the various letters of the type are carried into the receiver. The current used is about 1 ma., but of 60 or 70 volts. Each letter of the printed matter, as it passes over the small aperture in the slab, gives, he says, a different sound effect from every other; whatever the difference in shape between any two letters, it expresses itself in a difference of tone which, with practice, the blind person would recognise. This sound alphabet, of course, has to be learned, but with practice the line of type can be moved across the aperture at the rate of several words a minute, and the sense becomes intelligible to the hearer. The maximum sound is heard in the telephone when the paper exposed is white and the minimum when it is black; therefore, what the sightless person has to learn are the variations between these two extremes. For demonstration purposes Dr. d'Albe used large printed letters, but he said that by a focussing arrangement the instrument could be adapted so as to make it possible to read type of ordinary size.

THE Hunterian lecture on Paget's Disease of the Nipple will be delivered in the theatre of the Royal College of Surgeons of England by Professor W. Sampson Handley to-day, Friday, Feb. 16th, at 5 P.M.

THE Milroy lectures of the Royal College of Physicians of London are to be delivered on Feb. 22nd, 27th, and March 1st by Dr. W. J. Howarth, his subject being "Meat Inspection, with Special Reference to the Development of Recent Years." On March 13th, 15th, and 20th Dr. G. A. Sutherland will give the Lumleian lectures of the College on "Modern Aspects of Heart Disease," and the Goulstonian lectures, with "Paratyphoid Infections" as their theme, will be delivered by Dr. C. H. Miller on March 22nd, 27th, and 29th. The time in each case is 5 P.M.

#### THE UNRESTRICTED DIET OF A SEDENTARY WORKER.

By A. D. WALLER, M.D. ABERD., F.R.S.

ABOUT three months ago, at the instigation of my friend Sir W. Osler, I took a summary measurement of my daily food during three days of my ordinary unrestricted diet. Sir William had banteringly reproached me with eating too much during war-time, saying that I must be a 5000 Calories man.

The figures for my three days' trial came out as follows. The decimals attached to these figures may seem absurd in connexion with such rough weighings; their appearance is due to the fact that the calculations were made on a Comptometer by my assistant, Mr. Shapiro. They serve the purpose of enabling the arithmetic to be checked by seeing whether horizontal and vertical lines give the identical final results in Calories. The first three columns give the percentages of Protein, Fat, and Carbohydrate assumed for calculation of the actual quantities of P.F.C. in the materials swallowed.

Oct. 3rd, 1916.				Oct. 4th, 1916.				Oct. 5th, 1916.			
1. Early Tea.		% assumed.	1. Early Tea.	Grn. P. F. C.	1. Early Tea.	Grn. P. F. C.					
P. F.	O. C.	P. F.	O. C.	P. F.	O. C.	Bread	Cals.	P. F.	O. C.	Bread	Cals.
8 1 50 Bread	20 1·8 0·2	10 0	49·42	8 1 50 Bread	20 1·6 0·2	10 0	49·42	8 1 50 Bread	30 2·4	0·3	16·0
1 80 — Butter	5 0·05 4·0	—	37·405	1 80 — Butter	6 0·06 4·0	—	—	1 80 — Butter	5 0·05	4·0	—
3·5 4 5 Milk	20 0·7 0·8	1·9	14·41	3·5 4 5 Milk	20 0·7 0·8	1·0	14·41	3·5 4 6 Milk	30 1·06	1·2	1·6
— 100 Sugar	10 — —	10·0	41·0	— 100 Sugar	10 — —	10·0	41·0	— 100 Sugar	5 —	—	5·0
2·35 5·0 21·0 142·235				2·45 6·0 21·0 142·235				3·5 6·5 21·5 153·66			
2. Breakfast.				2. Breakfast.				2. Breakfast.			
8 1 50 Bread	75 60 0·75	37·5	186·325	8 1 50 Bread	(20 dry)	30 0	1·6	12·0	76·38	8 1 50 Bread	(20 dry)
1 80 — Butter	30 0·3 24·0	—	228·43	1 80 — Butter	30 0·3 24·0	—	—	1 80 — Butter	15 0·15	12·0	—
3·5 4 5 Milk	300 10·6 12·0	15·0	216·15	3·5 4 5 Milk	400 14·0 16·0	—	—	3·5 4 6 Milk	400 14·0 16·0	—	—
10 50 — Bacon	20 2·0 10·0	—	101·20	10 50 — Bacon	20 2·0 10·0	—	—	10 2 — Fish	65 1·3	—	38·74
12 12 — Egg	50 6·0 6·0	—	80·40	12 12 — Egg	50 6·0 6·0	—	—	— 100 Sugar	10 0·25	—	10·0
— 100 Sugar	25 — —	25·0	102·50	— 100 Sugar	25 — —	25·0	102·50	— 100 Marmalade	50 0·25	0·05	26·0
0·5 0·1 50 Marmalade	50 0·25 0·05	26·0	103·98	— 100 Wine	(150) — —	—	—	— 100 Wine	150 — —	—	—
25·66 52·8 102·6 1013·986				30·36 58·25 112·0 1125·36				8 1 50 Bread			
3. Lunch.				3. Lunch.				16 5 — Meat <td data-kind="ghost"></td> <td data-kind="ghost"></td> <td data-kind="ghost"></td>			
8 1 50 Bread	60 4·8 0·6	30·0	148·26	8 1 50 Bread	45 3·6 0·45	22·5	111·195	2 0·1 20 Potatoes	30 0·6	0·03	6·0
1 80 — Butter	15 0·15 12·0	—	112·215	1 80 — Butter	10 0·1 8·0	—	—	1 80 — Butter	5 0·05	4·0	—
16 5 — Meat	25 3·75 1·25	—	27·0	10 2 — Fish	60 6·0 1·2	—	—	1 80 — Wine	150 — —	—	37·406 (32·5 cals.)
25 25 Cheese	15 3·75 3·75	0·375	51·7875	2 2 40 Pudding	50 1·2 1·2	24·0	114·48	2 0·1 20 Potatoes	30 0·6	0·03	27·339
— 100 Sugar	10 — —	10·0	41·0	— 100 Wine	(150) — —	—	—	2 0·1 20 Potatoes	30 0·6	0·03	32·4
5°/o Alc. Wine	(150) — —	—	—	10·9 10·85 46·5	33·6 245	— 100 Sugar	—	— 100 Wine	150 — —	—	—
12·45 17·6 40·375 380·282				3·5 4 5 Milk				16 6 10·755 38·375 522·219			
4. Afternoon Tea.—N1.				4. Afternoon Tea.				5·Dinner.			
2 2 6 Soup	150 3·0 3·0	9·0	77·1	8 1 50 Bread	40 3·2 0·4	20·0	98·84	2 2 6 Soup	200 4·0 4·0	12·0	102·8
10 2 — Fish	40 4·0 0·8	—	23·84	1 80 — Butter	10 0·1 8·0	—	—	15 6 — Meat	85 12·75	4·25	91·8
15 5 — Meat	60 9·0 3·0	—	64·8	— 100 Sugar	5 0·35 0·4	0·5	—	15 6 — Bread	80 12·75	4·25	—
2 0·1 20 Potatoes	50 1·0 0·05	10·0	45·565	3·5 4 5 Milk	10 0·35 0·4	0·5	—	8 1 60 Bread	80 12·75	4·25	—
1 80 — Butter	5 0·05 4·0	—	37·405	3·65 8·8 25·5	201·355	— 100 Wine	—	2 0·1 20 Potatoes	80 1·2 0·06	12·0	54·678
25 25 Cheese	10 2·5 2·5	0·25	34·525	15 5 — Meat	40 6·0 2·0	—	—	2 0·1 20 Potatoes	80 1·6 1·6	32·0	152·64
10 1 80 Biscuits	25 2·5 2·5	0·25	21·25	8 1 50 Bread	45 3·6 0·45	22·5	111·195	25 2·5 Cheese	15 3·75	3·75	51·7875
5% Alc. Wine	(300) — —	16·0	61·5	— 100 Wine	(100) — —	—	—	1 80 — Butter	10 0·1 8·0	—	74·81
— 100 Sugar	16 — —	16·0	61·5	5% Alc. Wine	(100) — —	—	—	1 80 — Jam	20 0·1 0·02	10·0	41·596 (70 cals.)
25·45 14·9 90·5 613·985				16·6 10·755 38·375 522·219				5·Dinner.			
6. Supper.				6. Supper.				5·Dinner.			
50% Alc. Whisky	(30)	—	—	8 1 50 Bread	15 1·2 0·15	7·5	37·085	2 2 6 Soup	200 4·0 4·0	12·0	102·8
10 1 85 Biscuits	25 2·5 0·25	21·25	99·7	25 25 Cheese	20 5·0 5·0	0·5	—	15 6 — Meat	85 12·75	4·25	91·8
2 5 0·25 21·25	99·7	—	—	50% Alc. Whisky	(30)	—	—	15 6 — Bread	80 12·75	4·25	—
Total	... ...	... ...	... ...	6·2 5·15 8·0	108·115	— 100 Wine	—	8 1 60 Bread	80 12·75	4·25	—
Total	... ...	... ...	... ...	70·05 98·86 298·375 2433·529 + (192·5)	—	— 100 Wine	—	2 0·1 20 Potatoes	80 12·75	4·25	—
Total calories = 2533·187	Total calories = 2536·028.										
Summary.				Summary.				Summary.			
P.	F.	C.	Calories.	P.	F.	C.	Calories.	P.	F.	C.	Calories.
Oct. 3rd	...	...	...	67·8	90·56	280·625	2270·857 + (282·5)	" 4th	...	...	...
" 5th	...	...	...	70·05	88·96	298·375	2433·529 + (227·5)	" 5th	...	...	...
Total for 3 days	...	...	...	210·225	265·515	882·125	6731·924	Total for 3 days	...	...	...
Average for 1 day...	70·05	98·86	298·375 2433·529 + (192·5)	682·6	931·917	2241·917	2271·476	Total for 3 days	...	...	...
Total	...	...	...	70·05	98·86	298·375 2433·529 + (192·5)	682·6	Total	...	...	...

There are several points of interest in this series of summary observations. My average Calorie-consumption for the three days was 2471, inclusive of 227 Calories of claret and whisky, of which the calorific value is not undisputed.

Of the total 2471, breadstuffs constituted 840 Calories, which is equivalent to 334 grammes of breadstuffs—i.e., 5 lb. 3 oz. per week.

Of the 334 grammes of breadstuffs, 200 grammes were loaf bread and 134 grammes were puddings, &c.—i.e., 3 lb. 2 oz. of bread proper (loaf bread) and 2 lb. 1 oz. of other farinaceous foods.

100 parts of my bread materials were thus made up of 60 parts of loaf bread and 40 parts of other farinaceous materials.

I do not give my own case as representative, since I am 60 years of age, weigh 190 lb., and belong to the class of sedentary workers whose calorie requirements are considerably lower than those of the manual worker. I must, however, confess myself surprised that my Calories should be as low as 2244 (without alcohol). In my "Text-book of Physiology" I have given 3000 as the average Calorie requirements per working man per day for food as eaten, and that this should have as its foundation 1 lb. of bread per day (= between 1100 and 1200 Calories).

In the report by Dr. Leonard Hill to the Health of Munition Workers Committee the standard adopted is "about 3500 Cals. of food as purchased, and about 3000 Cals. as eaten." The average of five specimen diets at the end of the report comes out as 3111 Cals. as eaten. The proportion of bread to total in these diets is not given.

The ordinary prison diet—Diet B—adopted in 1899 on the advice of a Departmental Committee on Prison Dietaries, and now in operation, contains 3040 Calories, of which the bread, inclusive of flour and oatmeal, amounts to 2378 Cals., of which 1715 Cals. are afforded by 22 oz. per day of actual bread. On this diet, by courtesy of Sir Herbert Smalley, M.D., and of the authorities of H.M. Prison, Pentonville, I find as the result of the taking of the monthly weights of 107 cases that 82 per cent. of the prisoners gained weight, while 18 per cent. lost weight. This contrasts very favourably with the weight statistics previous to 1898 on the ordinary diet, which was then equivalent to only 2035, rising to 2579 Cals., under which 87 per cent. of prisoners suffered loss of weight.

## THE CONTROL OF VENEREAL DISEASES.

### *Syphilis in Paris.*

M. Gaucher, professor of medicine at the Hôpital Saint-Louis, in association with Dr. Bizard, gives some account of the prevalence of syphilis in Paris at the end of the second year of war. He begins with an instructive résumé which we may well reproduce:—

Before the war there were treated in the clinic 300 cases of recent syphilis out of 3000 cases of all kinds, a proportion of 1:10. In the first months of the war the figures were 800 out of 5000, or 1:6. In the following eight months, 600 out of 2300, or 1:4.

He deduces from these figures that the incidence of syphilis in general has increased in Paris by nearly two-thirds. Among civilians he has found an unaccustomed proportion of the very young and of elderly subjects. Out of 219 civilians, 37 were under 20 and 16 were over 50 years of age; and he reproaches these men with taking advantage of the absence of the men-at-arms to misbehave themselves. Among his military patients two-thirds were between 25 and 35 years, and out of 120 42 were married. This fact had produced a disastrous incidence of syphilis among married women, of whom, during a period of eight months, he had seen 120 (out of a total of 222 women) with recent syphilis. Professor Gaucher goes on to comment on the extraordinary frequency of gonorrhœa in addition to syphilis and to attribute both to the deficient enlightenment of both the public and the medical profession. Among the latter errors of diagnosis were almost the rule, and clinical instruction in venereal disease was therefore a first necessity. His colleague, Dr. Bizard, had recently addressed 22 conferences with 8000 men attending, as well

as five meetings of officers' training corps. Professor Gaucher sorrowfully records his experience that it is usual in France not to anticipate evils by prevention, but to await their occurrence before dealing with them, and he welcomes the recent appointment by the Minister of the Interior of a new commission to study the prevention of venereal diseases. His paper appears in *Paris Médical*.

### *Two Years' Experience of Arsenobenzol in France.*

In August of last year the Under Secretary of State for Military Hygiene addressed a questionnaire to the various military commands as to intravenous injections of arsenical preparations during the preceding period of two years. The replies have been summarised by M. Paul Ravant, médecin-major, in a recent number of the *Archives de Médecine et de Pharmacie Militaire* and afford statistical information of considerable value. The number of medical officers giving injections was 186 and the total number of injections given 94,762, of which all but 1537 were for syphilis. The preparations used were:—

	Times.
Neosalvarsan	35,826
Novarsenobenzol	37,352
Salvarsan and arsenobenzol	9,215
Ganyl	8,846
Luargol	3,523

The dose given was usually 0·6 to 0·75 gm., exceptionally 0·9, and even up to 1·5 gm. All began with a small dose. Salvarsan and arsenobenzol were always given diluted to 150 or 200 c.c. with saline; neosalvarsan and novarsenobenzol in a large proportion of cases in concentrated solution, often as little as 1 or 2 c.c. Ganyl and luargol injections ranged between 5 and 20 c.c. in bulk. No fatal case was reported among the 95,000 injections, but a military doctor reported having seen a Belgian soldier in a neighbouring service who died of arsenical intoxication after a dose of 0·3 gm. neosalvarsan, his death being attributed to arsenical idiosyncrasy. Of the more serious accidents observed, one man had transient coma, another delirium and epileptiform crisis (both after neosalvarsan), four had transient "nitritoid crises" (after ganyl), two had meningeal irritation and two facial paralysis (after neosalvarsan), two had epileptic crises, (neosalvarsan 1, ganyl 1). Albuminuria, always transitory, occurred in 11 cases (neosalvarsan 4, novarsenobenzol 2, salvarsan 1, ganyl 3, luargol 1), a passing icterus in 20 cases (in about the same proportion). One case of acute dermatitis followed a luargol injection, two cases were intolerant of neosalvarsan, which had in consequence to be discontinued. Local accidents were rare, abscess only occurred 4 times and was then attributed to faulty technique. The general criticism of the various preparations may be given in full:

Neosalvarsan: Very good.

Novarsenobenzol: Preferred. All find it at least equal to neosalvarsan, sometimes better. The incidents attendant on injection appear less frequent.

Salvarsan and arsenobenzol: Are considered very active. Have only been employed in default of the preceding, of which the injection is much simpler and more rapid. Only one doctor remained faithful to its use throughout.

Ganyl: Very active, according to some. Complaint is made of variations in manufacture, differences of solubility, and frequency of small accidents following injection. Owing to the last fact, a dose of 0·2 gm. has rarely been exceeded, which has diminished the efficacy of the treatment.

Luargol: Is arsenobenzol reinforced with silver and antimony. Some doctors find it extremely active. Complaint has been made that it has produced induration of the veins of the arm in consequence of too high a content of soda in the solvent.

An addendum records a fatal case, reported after the date of the inquiry, in a gunner 19 years of age, 48 hours after an injection of 0·9 gm. of novarsenobenzol. Coma was the first symptom, followed by convulsions and cyanosis. The necropsy revealed multiple congestion of all the organs, in particular of the brain. The reporting medical officer ascribed the accident to an ampoule of which the contents had deteriorated.

The report is a testimony to the remarkable safety of arsenical injections in skilled hands.

His Excellency the Chancellor of the Calcutta University has nominated Lieutenant-Colonel R. P. Wilson, F.R.C.S., D.P.H., I.M.S., to be an Ordinary Fellow of the University.

## NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENTS.)

*Quinine Production and Investigation of Indian Indigenous Drugs.*

Lieutenant-Colonel Sir Leonard Rogers, I.M.S., was recently examined as a witness by the Industries Commission in Calcutta in regard to the production and manufacture of quinine. The cinchona plantations, he said, had been considerably extended in the Darjeeling hills, and the output of quinine increased. The last report showed that the plantations had been a sufficient financial success to render further extension advisable. The supply of quinine to treat the millions suffering from malaria in India was entirely inadequate, and the economic loss occasioned thereby in Bengal and other malarious parts of India was incalculable. Sir Leonard Rogers added that at present there was no professorship of pharmacology in India, and no considerable amount of original investigation of drugs had yet been carried out in the country. One such post had, however, been sanctioned for the School of Tropical Medicine after the war. Many indigenous drugs still required scientific investigation, and half a lakh of rupees had recently been given by the Maharaja of Darbhanga for this special work.

*Prison Improvement in Burma.*

Major H. H. G. Knapp, I.M.S., Inspector-General of Prisons, Burma, has been placed on special duty to visit the more important jails in the Madras, Bengal, and Bombay presidencies and in the provinces of Bihar and Orissa, the United Provinces, and the Punjab, to study the most recent methods adopted for the accommodation and reformation of prisoners and for the training of them for their return to ordinary life. The Governments concerned have offered him every facility.

*Scottish Women's Hospitals.*

Lord Carmichael presided recently at a meeting in aid of the Scottish Women's Hospitals for foreign service. Contributions of Rs. 80,000 were announced and it is hoped that two lakhs of rupees will be forthcoming.

*The Catherine Booth Hospital at Nagercoil.*

Inaugurated in 1900, this hospital has grown from a modest dispensary into a well-equipped institution with general and private wards covering seven acres of ground. Connected with the hospital are four branch institutions. The Maharaja of Travancore has built a new men's ward at a cost of Rs. 3500, while his Government has made frequent grants-in-aid.

*Death of Dr. B. K. Coomar.*

Dr. Bepin Krishna Coomar, the news of whose death from diabetic coma at the age of 67 has just reached this country, was one of the best known Bengali medical men. Entering Calcutta Medical College in 1868, he qualified in 1875 and became house surgeon to the Medical College Hospital, starting in private practice two years later. Dr. Coomar was an honorary magistrate, for several years a Commissioner of the Bali municipality, and an active member of the Indian Association for the Cultivation of Science.

Jan. 20th.

**THE SERVICES.****ROYAL NAVAL MEDICAL SERVICE.**

Staff-Surgeons to be Fleet-Surgeons : E. Cox, J. Macdonald, A. La T. Darley, A. J. Wernet, C. E. C. Stanford, A. R. Thomas, T. F. O'Keefe, R. F. Hills, D. V. Lowndes, P. F. Alderson, J. Thornhill. To be temporary Surgeons : B. L. Lloyd, N. H. Smith.

**ARMY MEDICAL SERVICE.**

Col. C. Birt is retained on the Active List, under the provisions of Articles 120 and 522, Royal Warrant for Pay and Promotion, and to be supernumerary.

Major Sir Edward S. Worthington, C.M.G., M.V.O., to be a Deputy Assistant Director-General, vice Lieut.-Col. G. St. C. Thom, C.M.G., who has vacated the appointment.

**ROYAL ARMY MEDICAL CORPS.**

To be acting Lieutenant-Colonels whilst in command of a Field Ambulance : Major J. W. H. Houghton, Major B. S. Bartlett, D.S.O., Brevet Lieut.-Col. Henry J. Crossley.

Temp. Major T. R. Hillott to be temporary Lieutenant-Colonel.

Major (temp. Lieut.-Col.) G. H. Ferguson relinquishes his temporary rank on reporting.

Major A. H. Burgess, R.A.M.C., T.F., to be temporary Lieutenant-Colonel.

To be temporary Lieutenant-Colonel whilst employed at the Grove Military Hospital, Tooting : E. W. Goodall.

Major R. G. Anderson is restored to the establishment.

Major (acting Lieut.-Col.) A. B. Hinde relinquishes his acting rank on reporting.

Temp. Capt. J. A. Torrens to be temporary Major.

To be temporary Captains : J. Watson, Surg.-Capt. H. J. Shone (Jersey Militia), H. E. Hobson (late temporary Captain, R.A.M.C.), E. C. Lindsay (late temporary Captain, R.A.M.C.).

To be temporary Honorary Captain : Temp. Hon. Lieut. H. A. F. Wilson.

Temporary Lieutenants to be temporary Captains : L. S. H. Gianville, W. Roche, J. S. Doyle, J. F. Wood.

Temp. Lieut. Charles C. Gibson to be temporary Captain.

To be temporary Lieutenants : J. B. Lester, C. W. Windsor, S. Marle, A. H. Bostock, A. McK. Niven, W. A. Smith, W. Hibbert, M. Crowley, C. B. Simpson, D. L. Morrison, T. Archdeacon, P. W. Ashmore, J. Reid, F. R. Tickle, A. Kirkhope, V. G. Ward, J. H. Pratt, G. P. Barff, H. S. McLellan, A. L. Gardner, A. K. S. Wyborn, W. Hartland, T. W. Arnison, J. H. F. Wilgress, W. E. Tanner, J. Howells, M. Hooper, H. L. V. Wemyas, W. H. Cam, F. Osborne, A. W. MacK. Sutherland, H. H. V. Welch, K. L. Bates, E. K. Campbell, J. M. N. S. Bickerton, E. Rommel.

The following relinquish their commissions : Temp. Hon. Capt. J. D. Lyle (having resigned his appointment at the British Red Cross Hospital, Netley), Temp. Hon. Capt. W. D. Copplestone (having resigned his appointment with the St. John Ambulance Brigade Hospital), Temp. Capt. B. C. Ashton (on appointment to Indian Medical Service), Temp. Lieut. W. M. Cromble (on appointment to Indian Medical Service), Temp. Lieut. T. Anwyl-Davies (on account of ill-health).

**SPECIAL RESERVE OF OFFICERS.**

To be Lieutenants : J. A. Panton (from Manchester University Contingent O.T.C.), N. C. L. B. Tweedie (from Belfast University Contingent O.T.C.), P. D. McLaren (from Edinburgh University Contingent O.T.C.), J. R. S. Mackay, D. J. Batterham and T. L. Heath (from University of London Contingent O.T.C.).

Lieutenants to be Captains : G. I. Evans, D. M. M. Fraser, R. S. Woods, G. S. Davidson, W. C. C. Haston, J. A. Mackenzie, W. N. Greer, D. G. Duff, A. McL. Ferrie, I. MacKenzie, E. A. Mills, C. Milne, J. Milne, C. P. Penberthy, M. Stewart, B. W. Fish, C. R. Knowles, R. S. Aspinall, D. S. Scott, N. H. Harrison.

**TERRITORIAL FORCE.**

Capt. (temp. Major) D. Dickie, D.S.O., relinquishes his temporary rank on alteration in posting.

Capt. A. S. Hobblethwaite, from West Riding Casualty Clearing Station, to be Captain.

Capt. H. N. Burroughes, F. Coleman, and S. F. Linton to be acting Lieutenant-Colonels whilst commanding a Field Ambulance.

Capt. W. H. Rothwell, from 3rd East Lancashire Field Ambulance, to be Captain.

Capt. E. H. Butler, from Territorial Force Reserve, to be Captain.

Capt. (temp. Lieut.-Col.) H. K. Dawson relinquishes his temporary rank on ceasing to command a Field Ambulance.

Lieut. A. G. Reid to be Captain.

Capt. G. C. Gray relinquishes his commission on account of ill-health contracted on active service and is granted the honorary rank of Captain.

Major (temp. Lieut.-Col.) P. R. Ash relinquishes his temporary rank on ceasing to command a Field Ambulance.

**URBAN VITAL STATISTICS.**

(Week ended Feb. 10th, 1917.)

*English and Welsh Towns.*—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18,000,000 persons, the annual rate of mortality was equal to 21.3, against 17.0 and 18.7 per 1000 in the two preceding weeks. In London, with a population of more than 4,000,000 persons, the death-rate was 22.2, or 2.4 per 1000 higher than that recorded in the previous week; in the remaining towns the rate ranged from 11.4 in Hornsey, 12.8 in Knfield, and 12.9 in Wimbledon and in Wakefield, to 33.5 in Brighton, 33.7 in Bath, and 34.0 in Wigan. The principal epidemic diseases caused 276 deaths, which corresponded to an annual rate of 0.8 per 1000, and included 89 from measles, 66 from diphtheria, 58 from infantile diarrhoea, 49 from whooping-cough, 9 from scarlet fever, and 7 from enteric fever. The deaths from measles, whooping-cough, and diphtheria were in excess of the average in the three preceding weeks; measles caused a death-rate of 1.6 in East Ham, 1.8 in Wimbledon, 1.9 in Barrow, and 4.2 in Wigan. The 801 cases of scarlet fever and the 1427 cases of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 17 and 3 less than the numbers at the end of the previous week. Of the 7058 deaths from all causes in the 96 towns, 274 resulted from violence. The causes of 90 of the total deaths were uncertified, of which 24 were registered in Birmingham, 13 in Liverpool, and 6 each in Preston and South Shields but only 3 in London.

*Scotch Towns.*—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death rate was equal to 17.9, against 16.9 and 17.7 per 1000 in the two preceding weeks. The 379 deaths registered in Glasgow corresponded to an annual rate of 17.7, against 22.2 per 1000 in London, and included 12 from whooping-cough, 10 from measles, 2 from diphtheria, and 1 each from scarlet fever and infantile diarrhoea. The 130 deaths in Edinburgh were equal to a rate of 20.4 per 1000, and included 5 from whooping-cough and 1 each from measles and infantile diarrhoea.

*Irish Towns.*—The 215 deaths registered in Dublin were equal to an annual rate of 28.1 per 1000, and included 6 from measles, and 1 each from diphtheria and infantile diarrhoea. In Belfast 240 deaths were recorded, equal to a rate of 31.8 per 1000, and included 2 from infantile diarrhoea and 1 each from measles, whooping-cough, and diphtheria.

AT the last meeting of the Chipping Sodbury board of guardians the salary of the district medical officer was increased by £20 in consideration of the high price of drugs at present prevailing.

## Correspondence.

*"Audi alteram partem."*

### THE DIFFERENTIATION OF HEART MURMURS IN SOLDIERS.

*To the Editor of THE LANCET.*

SIR,—Perhaps I may be permitted to make a few comments upon the letters that have appeared upon the subject of my letter in your issue of Nov. 4th, 1916. In the first place, may I remind your correspondents that the object of my communication was to call attention to a simple method by the practice of which I ventured to hope a common mistake might be avoided—I mean the mistake of confusing functional derangement of the heart with organic valvular disease—by means of the pressure test described.

I was pleased to have Dr. Leslie Thorne Thorne's corroboration and experience, and I may truthfully say that the more I have seen of these cases in returned soldiers the more convinced have I become of the value of the test. I must, however, insist upon the necessity for firm pressure, by which the ribs are pressed in by the fingers holding the bell-piece of the stethoscope, and their vibrations thus controlled as far as possible; for, unless this be done, some part of the functional bruit may persist and the observer be led into error.

In reply to Dr. A. Kinsey-Morgan, who questions the frequency of murmur in the cases under discussion, I must repeat that in my experience, derived from the control of medical wards containing upwards of 100 beds, they have been very frequent, though mutable and inconstant; in some, present alone in the recumbent position and altogether inaudible when standing, whilst in others the reverse order holds. In some the murmur is only audible when the patient is lying on his left side; in others, again, it ceases when he draws a long breath, and returns at the end of expiration. It is strange that Dr. A. Kinsey-Morgan should suggest that the bruit to which I referred was the so-called cardio-pulmonary murmur, a well-known type of functional murmur, for, as it happens, the cardio-respiratory bruit, as I have been accustomed to interpret the phenomenon, is, so far as I have been able to discover, the only functional murmur that has consistently withstood the effects of pressure.

I am indebted to Dr. Theodore Fisher for his remarks upon the causation of functional bruits, which greatly interested me; but I trust he will forgive me if I confine myself at present to their behaviour in response to the pressure test and its diagnostic value. I would say, however, that I do not think that the murmurs we render inaudible by pressure are caused by valvular leakage; in other words, I have not been able to regard them as endocardial. That they are the result of some functional disturbance in the cardiac muscle contractions producing vibrations communicated to the chest-wall is more than likely, and for this bruit I ventured to suggest in a paper published in *THE LANCET* in 1895 the name of neuro-typtic, compounded of neuron and typto. But it is obvious that this explanation will not cover the entire ground, though I would still regard them as exocardial—as opposed to valvular—murmurs. I may mention that the murmurs of dilatation are not rendered inaudible by pressure, nor are the bruits associated with and ascribed to anaemia (pulmonary systolic). But, on the other hand, systolic murmurs generated at the aortic orifice and conducted to the apex, and often mistaken for evidence of mitral regurgitation, may be arrested by pressure.

I am, Sir, yours faithfully,

Newcastle-on-Tyne, Feb. 3rd, 1917.

DAVID DRUMMOND.

### THE PHENOMENA OF ANAPHYLAXIS.

*To the Editor of THE LANCET.*

SIR,—I fear that I have already trespassed too much on your valuable space, but there is one comment that I should like to make on Captain S. Wyard's letter in your issue of to-day's date. If I understand him correctly, he suggests that the first case I reported, in which the patient received injections of antistreptococcal serum and a streptococcal vaccine, is not a true case of serum anaphylaxis, but is the result of

injecting anaphylatoxin produced by the action of the antistreptococcal serum on the streptococci. It seems to me impossible to accept such an explanation on the following grounds. In the classical experiments of Friedemann, Friedberger, and others on the *in vitro* production of anaphylatoxin, the methods adopted involved the action of considerable amounts of active complement on sensitised protein or bacteria. The various brands of antisera on the market, which have always been stored for some time before use, are in most cases almost destitute of active complement, or contain the mere trace. Again, the production in the test-tube of anaphylatoxin involves either prolonged action on ice or at room temperature or a moderate incubation time at 37° C. As I stated in my letter, the vaccine and antiserum were in this case mixed in the syringe immediately before use and therefore were only in momentary contact at room temperature before inoculation. It is, of course, theoretically possible that the antiserum might sensitise the bacteria so that they were subsequently acted upon by the patient's own complement. This explanation is, I think, completely ruled out by the results of the extensive use of sensitised vaccines, which are, by common consent, less toxic than the non-sensitised variety. There seems to be no reasonable doubt that the anaphylactic symptoms must be attributed in this as in the other cases to the action of the serum.

I was greatly interested by Captain Wyard's statement that the cases in which he had himself observed anaphylactic symptoms were those which had received a series of doses at short intervals. Since my last letter appeared Professor Leyton has very kindly called my attention to a series of observations published by him in the *Journal of Hygiene* in 1908, which bear a striking resemblance to those I reported. It seems to me that it would be of great value if those who are working with antisera would publish any results of the kind which they may have obtained, since at the present time it is most desirable that the risk involved should be accurately estimated.—I am, Sir, yours faithfully,

W. W. C. TOPLEY.

Bacteriological Department, Charing Cross Hospital,  
Feb. 10th, 1917.

### THE "TOXIC" EFFECTS OF METHYLENE-BLUE.

*To the Editor of THE LANCET.*

SIR,—It is generally admitted that the administration of methylene-blue has been followed by the most satisfactory results in the treatment of malaria and many other affections. In your issue of Dec. 23rd last appeared a note by Mr. Clifford Dobell and Dr. G. O. Low on the Treatment of *Lambia* Infections, in which it is stated that treatment by methylene-blue had to be discontinued owing to the "toxic" effects produced. In case any who might wish to employ this valuable remedy should be deterred from doing so by consideration of this finding, I desire to place before your readers the results of my experience in the use of methylene-blue.

Many years ago<sup>1</sup> in conjunction with Mr. F. W. Gee, I.M.S., I conducted a series of experiments, not only on natives of India but on British officers and others, with a view to ascertain the value of methylene-blue in the treatment and prophylaxis of malaria. Chloride of zinc is employed in the preparation of this drug, and the slightest trace of this or other impurity remaining in the finished product is apt to set up severe vesical and rectal irritation; the supply obtainable at that time in India was evidently impure, as we had many cases of retention of urine and severe tenesmus. During recent years I have, at home, employed methylene-blue in the treatment of many cases of various kinds without any complaints from the patients.

After reading Mr. Dobell's and Dr. Low's communication, with a view of testing the conclusions I placed a patient showing a heavy "*Lambia*" infection on 9 grains per diem of methylene-blue (3 grains with 1 grain extract, hyoscyami in the form of pill three times a day); in all 72 grains were given. The patient did not manifest the slightest discomfort, the general condition improved with increase of body weight, and regular

<sup>1</sup>On the Use of Methylene-blue in Malarial Fever, Indian Medical Gazette, xxviii., 1893.

examination of the stools showed a steady decrease in the number of cysts and free living forms. At present, only a very few cysts can be detected after prolonged search. One is forced to the conclusion that either in the case reported by Mr. Dobell and Dr. Low a pure sample of methylene-blue was not obtained or that the patient was peculiarly intolerant of the remedy.

To anyone who wishes to obtain pure methylene-blue I shall be glad to furnish the name of a drug-house, in Edinburgh, where a supply may be obtained which is "above suspicion."

I am, Sir, yours faithfully,

University of Edinburgh, Feb. 5th, 1917. D. G. MARSHALL.

## THE ASSOCIATION OF ATROPHY OF THE TESTICLE AND INGUINAL HERNIA.

*To the Editor of THE LANCET.*

SIR.—Two patients arrived from France recently with inguinal hernia and atrophy of the testicle on the same side as the hernia. The wasted testes were half as small as those of the opposite ones, and neither of the patients was conscious of this condition. Both of the atrophied testes were well descended in the scrotum. The rarity of this state points rather to a coincidental than a developmental condition. It has an important bearing to the surgeon, who may receive the credit of producing the abnormality, as after the operation the testes will still remain atrophied. I have pointed out the condition to each patient and have asked them to sign a statement that the testicle on the side of the hernia is much smaller than the other testicle. This will not prevent the unscrupulous or the ignorant passing an adverse criticism to suit their own purposes, but it will safeguard the surgeon in case of litigation.—I am, Sir, yours faithfully,

JOSEPH E. G. CALVERLEY, C.M.G., B.S. Lond.

Folkestone, Feb. 8th, 1917.

## PNEUMATIC TOURNIQUETS.

*To the Editor of THE LANCET.*

SIR.—The use of the sphygmomanometer armlet as an agent for obstructing the venous return when either venesection or intravenous medication is to be practised has probably occurred to many physicians. Dr. Hildred Carlill's letter in your issue of Feb. 10th confirms generally what has previously been written on the subject. Dr. J. Alfred Codd drew attention to the method in the *British Medical Journal* of Dec. 11th, 1915, and in the same journal on Jan. 29th, 1916, I ventured to add one or two practical points based on my own experience. One of these I should like to repeat, as I have seen the neglect of it lead to trouble. It is that the armlet prior to inflation should not grip the arm too closely—that, in other words, the constricting force should be provided solely by the air driven into the air-bag and not by the armlet band. Unless this is remembered the deflation of the air-bag at the moment the operation is completed will not entirely remove the obstructing pressure from the vein, and one of the consequences of this may be an unnecessary haematoma at the site of puncture. In short, the firm application of the armlet practised in taking the "blood pressure" ought to be avoided when the armlet is used to obstruct the venous return as a necessary preliminary either to venesection or to intravenous medication.

I am, Sir, yours faithfully,

Harley-street, W., Feb. 12th, 1917. C. O. HAWTHORNE.

## THE FIRST SCHOOL FOR MOTHERS.

*To the Editor of THE LANCET.*

SIR.—The article on child welfare work in THE LANCET of Jan. 27th mentions the year 1899 and refers to the foundation of the first school for mothers in the borough of St. Pancras "eight years later." An opportunity was given me to come up from Winchester, where I was then medical officer of health, to attend the opening meeting, which, if my memory serves, took place in the late spring of 1907.

From the annual report for 1906 on the health of the City of Winchester it appears that in November of that year—

.....arrangements were made for the notification of births by midwives within 14 days, the fee offered being 2d. for each birth, or 3d. if the notification also stated the weight of the child at birth. Midwives were supplied with copies of two pamphlets, one entitled "Advice to Mothers," the other

"How to bring up a Baby on the Bottle." Each pamphlet pointed out the advantages of periodical weighing and contained an invitation to mothers to bring their babies once a fortnight to be weighed on the corporation weighing machine. Tea is provided for the mothers gratis.

The mothers attending were advised by the medical officer of health, and the first client was secured some time in the last half of the month of November, 1906. The annual report dated April 16th, 1907, states that eight mothers were attending regularly, presumably on some earlier date when the manuscript of this section of the report was sent to the printer.

If you can find space for the publication of this letter it will serve to give to the corporation of the City of Winchester the credit which is due of founding the first school for mothers in this country.

I am, Sir, yours faithfully,

J. E. SANDILANDS,

Medical Officer of Health, Royal Borough  
of Kensington.

## STOCK MIXTURES AND PANEL PRACTICE.

*To the Editor of THE LANCET.*

SIR.—The annotation on Stock Mixtures in your issue of Feb. 10th might have laid more emphasis on two points in the circular.

1. The avoidance of deterioration is secured by the selection of the drugs and not by the addition of any form of preservative other than emulsion of chloroform, which appears to be employed more as a flavouring agent than on account of any special property, medicinal or otherwise.

2. Although the universal adoption of this list of stock mixtures will materially lighten the labours of pharmacists engaged in panel practice it is to be feared that, so far as the medical profession is concerned, while similarly reducing much routine, it must tend to diminish scientific progress and to limit the work of panel practitioners to the treatment of the most prominent symptom.

I am, Sir, yours faithfully,

Feb. 10th, 1917.

SOLlicitus.

## Medical News.

ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—At a meeting of Comitia of the Royal College of Physicians on Jan. 25th and of the Council of the Royal College of Surgeons on Feb. 8th diplomas of L.R.C.P. and M.R.C.S. were respectively conferred upon 83 candidates (including five ladies) who have passed the Final Examination of the Conjoint Board in Medicine, Surgery, and Midwifery, and have complied with the by-laws of each College. The following are the names and medical schools of the successful candidates:

Jugal Kishor Adhya, Calcutta Medical College and Middlesex Hospital; Adolfo Arias, St. Bartholomew's Hospital; Cedric Whitfield Armstrong, London Hospital; Eric Miles Atkinson, St. Bartholomew's Hospital; Henry Hamilton Bailey, Durham University and London Hospital; Kenneth Norman Grerson Bailey, St. Bartholomew's Hospital; Edwin Jennings Ball, Bristol University; Douglas John Batterham, Cambridge University and St. Bartholomew's Hospital; Leslie Graham Blackmore, Middlesex Hospital; Charles James Longworth Blair, St. Bartholomew's Hospital; Harold John Blamied, St. Thomas's Hospital; Charles Sidney Bluemel, Colorado University and University College Hospital; Duncan Campbell Bluet, Cambridge University and St. Thomas's Hospital; William Hallock Bradstock, Columbia University; Hilda Kathleen Brade, Manchester University; John Burke, Glasgow University and London Hospital; Patrick Alfred Buxton, Cambridge University and St. George's Hospital; Charles Herbert Carroll, London Hospital; Duncan Gillard Churcher, St. Thomas's Hospital; Alan Andreas Cockayne, Cambridge University and St. Thomas's Hospital; Cyril John Chesterfield Cooke, University College Hospital; Gunaratnam Franklin Cooke, Ceylon Medical College and St. Bartholomew's Hospital; Jean Cretin, St. Bartholomew's Hospital; Ahmed Tayel Dabbous, Westminster and Guy's Hospitals; Albert Victor Surgeon Davies, St. Mary's Hospital; Mahmoud Abu Bakr Demerdash, Cairo and University College Hospital; Harold Aylmer De Morgan, Middlesex Hospital; Alan Roy Dingley, St. Bartholomew's Hospital; John Reginald Keith Penning, London Hospital; Langdon Percival Firman-Edwards, Cambridge University and St. Bartholomew's Hospital; Arthur Alfred Fitch, Liverpool University and St. Bartholomew's Hospital; Frederick Christopher Ashley Frith, Bristol University; William Vincent Gabe, Middlesex Hospital; Aziz Girgis, London Hospital; Lionel Bernard Goldschmidt, King's College Hospital; Harry Goudge Grant, Dalhousie University and University College Hospital; John Richard Harris, Cambridge University and St. Thomas's Hospital; Geoffrey Arthur Harrison, Cambridge

University and King's College Hospital; Thomas Lowthian Heath, Guy's Hospital; Norman Sinclair Hewitt, Cambridge University and London Hospital; George Hoffmeister, Middlesex Hospital; Malcolm Cyril Joynt, Guy's Hospital; Edward Athol Clarence Langton, St. Bartholomew's Hospital; Felix Raoul Leblanc, Guy's Hospital; Annie Lloyd, Royal Free Hospital; Elbert Ralph Longstaff, St. Bartholomew's Hospital; Ronald William Lush, Oxford University and Middlesex Hospital; Howard Douglas McIlroy, Cambridge University and London Hospital; Kenneth Alexander Ingleby Mackenzie, Oxford University and St. Bartholomew's Hospital; Keith Masson, Cambridge University and St. Bartholomew's Hospital; Maurice William Holt Miles, St. Thomas's Hospital; Marie Mathilde Alice Moralt, Royal Free Hospital; John Branwell Mudge, St. Bartholomew's Hospital; Elizabeth O'Flynn, Royal Free and St. George's Hospitals; Edmund Stuart Orme, Cambridge University and St. Thomas's Hospital; John Allison Panton, Manchester University; Maurice Pearson, Guy's Hospital; Cyril John Penny, Cambridge University and Middlesex Hospital; Victor Felicien Clement Joseph Philippe, Brussels University; Frank Portas, Westminster Hospital; Arthur Abercrombie Prichard, Cambridge and Glasgow Universities; Ernest Digby Roberts, Lausanne University; James Paterson Ross, St. Bartholomew's Hospital; Kenneth Mackinnon Ross, London Hospital; George Harold Rosdale, Oxford University and St. Bartholomew's Hospital; Narendra Mohan Sen-Gupta and Mandell Shimbir, London Hospital; Raghunath Dadoba Shirwarkar, Bombay University and University College Hospital; Flora Nihal Singh, Calcutta Medical College and Royal Free Hospital; Charles Rees Smith, Guy's Hospital; Neville Harcastle Smith, Cambridge and Liverpool Universities; Vincent Russell Smith, St. Mary's Hospital; John Green Stevens, Guy's Hospital; David Stewart, Manchester University; Daniel Jenkins Thomas and John Herbert Thomas, University College Hospital; Wilfred Graham Verniquet, Cambridge University and St. Bartholomew's Hospital; Herman Crowther Viehoff, Liverpool University; Sydney Arthur Thomas Ware, St. Thomas's Hospital; Arthur Alward Watkinson, Charing Cross Hospital; Edward Williams, London Hospital; and Arthur Trevor Woolward, Cambridge University and London Hospital.

\* Diploma of M.R.C.S. granted Dec. 14th last.

**ROYAL COLLEGE OF SURGEONS OF ENGLAND.**—An ordinary meeting of the Council was held on Feb. 8th, Sir W. Watson Cheyne, the President, being in the chair. It was resolved to grant diplomas of Membership to 82 successful candidates, and in conjunction with the Royal College of Physicians of London to give diplomas in Public Health to six successful candidates. The Finance Committee reported that £23,900 had been invested in the War Loan, including £2,000 of new money. It was referred to the Finance Committee to consider the desirability of obtaining a loan for the purpose of further investment in the War Loan. Captain Raymond Johnson was elected a member of the Court of Examiners. Mr. Herbert Furnival Waterhouse was elected a member of the Board of Examiners in Dental Surgery. A letter was read from Lord Rhondda, President of the Local Government Board, stating that the suggestions made by the Council of the College on the subject of the treatment and prevention of venereal diseases will receive his careful and sympathetic consideration. A letter was received from Lady Eve thanking the President and Council for their kind expressions of sympathy in her bereavement. Sir John Bland-Sutton was appointed Bradshaw lecturer for the ensuing year.

Licences in Dental Surgery were conferred upon the following two gentlemen who have now complied with the requirements:—

Beresford Tom Richards, Birmingham University; and Reginald Joseph Ryland, Guy's Hospital.

**UNIVERSITY OF LONDON.**—At the First Examination for medical degrees, held recently, the following candidates were successful:—

Frances Dacre Alexander and Eleanor Mary Ashmall, London (Royal Free Hospital) School of Medicine for Women; Frederick Bach, London Hospital; Ormonde Alan Baker, University College; Gladys Liebs Buckley, Girton College; Dora Mahalski Cadman, London (Royal Free Hospital) School of Medicine for Women; Antoline Yves Cantin, London Hospital; Linda Catmur, Dorothy Spencer Chamberlain, Ivy Collier, and Annie Eveline Connan, London (Royal Free Hospital) School of Medicine for Women; Marguerite Etalline Cooke, private study; Rustam Nusserwanji Cooper, University College; John Alexander Currie, Guy's Hospital; Percy Tyson Davidson, Middlesex Hospital; Betty Dent, London (Royal Free Hospital) School of Medicine for Women; Conor John Donelan, St. Paul's School and St. Bartholomew's Hospital; Hilda Ray Dutton, University College, Exeter; Kerdwen Valentine Edwards, University College, Cardiff; Lucy Margaret Eison, Victoria University of Manchester; Rowland Henry Evans, University College, Cardiff; Geoffrey Edward Woolcombe Felce, Guy's Hospital; Emmie Dorothy Fenwick, London (Royal Free Hospital) School of Medicine for Women; Olive Gwendolin Fisk, Girton College; William John Gale, B.Sc., Battersea Polytechnic, South-Western Polytechnic Institute, and private study; Mark Garden, London Hospital; Lena Bella Gayer and Geraldine Norah Geary, London (Royal Free Hospital) School of Medicine for Women; Brian Wilson Barnett Gordon, Epsom College and St. Mary's Hospital; Barnett Gould, B.A., London Hospital; Marjorie Pearl Christine Greene, Roedean School; Stanley Allwright Gunter, St. Bartholomew's Hospital; Frederick James Simkin Hall, University College, Reading; Gertrude Eleanor Harre, Girton College and London (Royal Free Hospital) School of Medicine for Women; Elizabeth Merriman Heath, Marjorie Browning Hubert, and Irene

Esther Kenworthy, London (Royal Free Hospital) School of Medicine for Women; Oscar Bevan Lean, Bootham School; Jessie Levin, University College; Denzil Haydn Lewis, St. Mary's Hospital; Ivor Lewis, University College, Cardiff; Muriel Jessie Lough, B.Sc., Birbeck College; Mary Catherine Lynch, London (Royal Free Hospital) School of Medicine for Women; Ivan Bailey McCann, Guy's Hospital; Dorothy McNair, London (Royal Free Hospital) School of Medicine for Women; Edward Francis Malins, King Edward's High School, Birmingham; Harold Jordan Malkin, University College; Amis Mikhail, King's College; Emily Marjorie Milnes, London (Royal Free Hospital) School of Medicine for Women; Sybil Grace Vocatia (distinction in Inorganic Chemistry and Physics), King's College and London (Royal Free Hospital) School of Medicine for Women; Leslie Stuart Morgan, St. Bartholomew's Hospital; Doris Maude Odium, B.A., London (Royal Free Hospital) School of Medicine for Women; Winifred Catherine Piggott, Bootham School, Bedford College, and London (Royal Free Hospital) School of Medicine for Women; Mary Winifred Pitt-Lewis, Beatrice Myrtle Powell, and Gwenolen Mary Pratt, London (Royal Free Hospital) School of Medicine for Women; Margaret Annette Quine, Victoria University of Manchester; John G. Scott Reid, Epsom College and St. Thomas's Hospital; James Stuart Ricketts, King's College; Edith Margaret Ross-Johnson, Newnham College; Effie Frederike Amelia Samter, Victoria University of Manchester; B. Virginia Saunders-Jacobs, B.Sc., Newnham College; Alfred Senn, London Hospital; Christopher James Lewen Sharp, St. Paul's School; Thomas Archibald Shaw, Guy's Hospital and Mill Hill School; Abraham Isaac Silverman, Middlesex Hospital; Leonard Smalley, St. Thomas's Hospital; George Morris Stoker, Guy's Hospital; Edward Howard Strange, University College, Cardiff; William Hedley Summerskill, Guy's Hospital; Arthur Cleve Damian Telfer, St. Bartholomew's Hospital; Winifred Thompson, London (Royal Free Hospital) School of Medicine for Women; Estlin Hugh Weatherall (distinction in Biology), St. Bartholomew's Hospital; Leslie Ralph Augustus Wells, Guy's Hospital; Enid Margaret Williams, Swansea Technical College and King's College; Trevor Morgan Raleigh Williams, Swansea Technical College and University College; Henry Norman Witham, St. Thomas's Hospital; and Jacob Elias Zeitlin, London Hospital.

**Major R. W. Knox, D.S.O., I.M.S., has had conferred on him the Serbian decoration of the White Eagle.**

**CENTENARIAN.**—The death of Mrs. Hannah Lusted, of Lewes, at the age of 101, is reported.

The death occurred on Jan. 16th last of Mr. R. H. F. Rippon at Upper Norwood, where he had been resident for 36 years. He was 80 years of age, and for the past two years had been in receipt of a Civil List Pension of £100 per annum in recognition of his services to Natural History and Science.

**ROYAL SANITARY INSTITUTE.**—A discussion will take place to-day, Saturday, Feb. 17th, at 10.30 A.M., at the Town Hall, St. Helens, on Measures to be Taken to Prevent Contamination of Food by Flies. The discussion will be opened by Dr. Joseph Cates (medical officer of health), and the chair will be taken by Professor A. Bostock Hill.

**REGIUS PROFESSORSHIP OF PHYSIC IN DUBLIN UNIVERSITY.**—Our Dublin Correspondent writes: The vacancy in the Regius Professorship of Physic in the University of Dublin, caused by the death of Dr. James Little, has been filled by the appointment of Dr. John Mallet Purser, F.R.C.P.Irel. Dr. Purser was King's Professor of the Institutes of Medicine in the School of Physic from 1874 to 1901. His return to a position of influence in the University will please many generations of old Trinity College men.

**ST. MARK'S HOSPITAL, CITY-ROAD, E.C.**—The Lord Mayor of London, who presided at the eighty-first annual meeting of this hospital on Feb. 8th, in moving the adoption of the report, said that the accounts showed an adverse balance of £600, due in a great measure to the large number of war appeals and to considerable increase in the cost of everything connected with hospital administration. The need for this hospital was shown by the fact that it had treated 688 in-patients and nearly 1800 new out-patients during the year. Owing to the serious nature of the operations performed at this hospital a convalescent home is greatly needed, so that beds can be evacuated more quickly.

**NEW OUT-PATIENT DEPARTMENT AT THE ROYAL INFIRMARY, WIGAN.**—A memorial to the late King Edward, taking the form of a new out-patient department, was opened at the Royal Albert Edward Infirmary, Wigan, on Feb. 1st, by the Earl of Crawford and Balcarres, who, in an interesting speech on the progress of medical science, said that the success which the medical profession had achieved during the war was far in excess of anything that could have been predicted ten or even five years ago. The addition to the infirmary has been built at a cost of over £12,000, and represents the last of a series of extensions and enlargements which have been made at intervals since the foundation of the institution 40 years ago. As the new buildings were not begun till the beginning of the war their completion free from debt is an achievement of which Wigan may be proud.

# The War.

## THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue:—

### Died.

**Major V. H. Symons, R.A.M.C.**, was educated at Birmingham University, and qualified in 1901. He had held appointments at the General Hospital, Birmingham, and in South Africa and Australia, and died at the Military Hospital, Tidworth, from an illness contracted in France.

**Major W. Wiley, R.A.M.C.**, was educated at Trinity College, Dublin, and qualified in 1903. After holding a house appointment at the Staffordshire General Hospital, he joined the R.A.M.C. in 1904.

**Dr. Isobel A. Tate**, who died whilst on duty at the Military Hospital, Malta, received her medical education at Belfast and at Dublin, qualifying in 1899, and had held several public appointments. Dr. Tate was acting as senior surgeon to Mrs. Stobart's medical unit in Serbia, but contracted typhoid fever and was invalided home just prior to the historical Serbian retreat.

### Wounded.

**Capt. J. A. C. Scott, R.A.M.C.**, attached Durham Light Infantry.

**Capt. J. M. Young, R.A.M.C.**, attached Highland Light Infantry.

**Capt. W. S. Evans, R.A.M.C.**, attached Royal Welsh Fusiliers.

**Lieut. R. A. Slater, R.A.M.C.**, attached Royal Field Artillery.

## OBITUARY OF THE WAR.

### HAMILTON MATHEWSON, M.B., B.CH. BELF.

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Temporary Captain H. Mathewson, who was killed on active service in November last, was 24 years of age and was the seventh son of the late Andrew Mathewson, Dunbunraver House, Newtownstewart, co. Tyrone. He received his medical education at Queen's University, Belfast, graduating M.B., B.Ch., B.A.O. in 1910. In the same year he was appointed senior assistant at the Portsmouth Infirmary, and two years later resident medical officer to the Norwich Infirmary, with care of the Children's Homes, Norwich. He was about to take the surgical Fellowship of the Scottish Royal Colleges in March, 1915, when he obtained a commission in the R.A.M.C. and went to France. He was slightly wounded in



September last, remaining, however, on duty, and on Oct. 23rd was dangerously wounded by a sniper as he was attending to a wounded man in front of the lines, and died four days later.

A colleague at the Norwich Infirmary writes of Captain Mathewson as an excellent organiser and possessing marked surgical ability, coupled with a quiet and unassuming manner which made him popular with the staff and governors.

### DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

**Capt. B. J. C. Dudley**, Dorsetshire Regiment, attached Nigeria Regiment, third son of Brigade-Surgeon Lieut.-Col. W. E. Dudley, of Bath.

**Capt. A. Lord**, Welsh Regiment, eldest son of Dr. R. E. Lord, of Colwyn Bay.

## THE HONOURS LIST.

The following awards to medical officers are announced:—

### Distinguished Service Order.

**Major John Edward Briscoe, S. African M.C.**

For conspicuous gallantry and devotion to duty. Although himself wounded, he continued to tend wounded men under very heavy fire. He set a splendid example of courage and coolness throughout.

### Bar to Military Cross.

**Temp. Capt. Kenneth William Mackenzie, M.C., R.A.M.C.**

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in conducting a hazardous and very difficult enterprise for the rescue of wounded from dug-outs in the newly-captured enemy trenches. He set a splendid example throughout.

(The award of the Military Cross was recorded in THE LANCET of Nov. 4th, 1916, p. 770.)

### Military Cross.

**Temp. Lieut. James Lang Cochrane, R.A.M.C.**, attached Gloucester Regiment.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in tending the wounded under heavy fire. He has on many previous occasions done fine work.

**Captain Arthur George Fisher, R.A.M.C., Special Reserve.**

For conspicuous gallantry and devotion to duty. He went forward to the front line under very heavy fire to locate some wounded men, whom he later succeeded in rescuing. He had previously done fine work.

**Capt. John Valentine Macdonald, I.M.S.**, attached Indian Army.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in attending to the wounded under very heavy fire. He had previously done fine work.

**Temp. Capt. Arthur John Rushton O'Brien, A.M.S.**, attached Gold Coast Regiment.

For conspicuous gallantry and devotion to duty. He repeatedly dressed and tended wounded men under very heavy fire. He set a splendid example of courage and coolness throughout.

**Temp. Capt. James Edmund Rutherford, R.A.M.C.**, attached Royal Irish Regiment.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in dressing the wounded under very heavy fire. He has on many previous occasions done fine work.

**Temp. Lieut. John Black Stevenson, R.A.M.C.**, attached Liverpool Regiment.

For conspicuous gallantry and devotion to duty. On four separate occasions he personally conducted stretcher-bearers through very heavy fire to succour wounded men. Later, although himself wounded, he continued to carry on his work.

**Temp. Capt. Roger Llewellyn Williams, R.A.M.C.**, attached S. Staffs Regiment.

For conspicuous gallantry and devotion to duty. He displayed marked courage and determination in tending the wounded under very heavy fire. He has on many previous occasions done fine work.

**Capt. Kenneth Alexander Gilchrist, S. African M.C.**

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in tending the wounded under very heavy fire. He set a fine example to those about him.

## MENTIONED IN DESPATCHES.

The names of the following medical officers are included in a despatch, dated Nov. 22nd, 1916, received from Lieut.-General the Hon. J. C. Smuts, Commander-in-Chief of the East African Forces:—

**Royal Navy.**—Temp. Surg. A. F. R. Woollaston. Staff, Headquarters, &c.—Maj. G. D. Maynard, S. Afr. Med. Corps; Lt.-Col. H. W. Vaughan-Williams, S. Afr. Med. Corps; Lt.-Col. J. H. Whitehead, S. Afr. Med. Corps.

**Royal Army Medical Corps.**—Capt. (temp. Maj.) J. A. Manifold; Temp. Capt. E. A. Gates.

**South African Medical Corps.**—Lt.-Col. T. Smyth; Lt.-Col. W. Field; Maj. J. E. Briscoe; Maj. H. S. Flock; Temp. Maj. J. Hunter; Maj. R. M. Truter; Maj. R. L. Girdwood; Maj. J. W. de Vos; Maj. C. M. Brothers (Dental Unit); Capt. (temp. Maj.) H. J. Orford; Capt. M. Heyns; Temp. Capt. K. A. Gilchrist; Capt. A. Groenewald, M.C.; Capt. N. J. Hofmeyr.

**Indian Medical Service.**—Maj. (temp. Lieut.-Col.) F. W. Sumner; Maj. E. T. Harris; Maj. A. Cameron; Maj. W. S. McGillivray; Capt. O. A. R. Berkeley-Hill; Capt. A. E. Grisewood; Capt. J. V. MacDonald.

**East African Medical Service.**—Capt. (temp. Maj.) A. D. J. B. Williams; Capt. A. A. H. Lawrence; Capt. J. C. Watt.

**Uganda Medical Service.**—Lieut.-Col. A. D. P. Hodges, C.M.G.; Temp. Maj. H. B. Owen.

**West African Medical Service.**—Temp. Capt. A. J. R. O'Brien.

**STAR AND GARTER HOME, RICHMOND.**—On Feb. 10th the Queen, on behalf of the British Red Cross Society, received the deeds of the land and building of the Star and Garter Home, together with those of Ancaster House, Richmond, an adjunct to the Home. Her Majesty also received £13,500 towards the endowment fund in addition to £18,000 the result of a collection among school children for a memorial to Jack Cornwell, V.C. This money will be used for the endowment of beds in the Home.

## THE CENTRAL MEDICAL WAR COMMITTEE.

The Central Medical War Committee, which sat for two days last week hearing appeals from the decisions of various Local Committees, pursued the same course this week. As had been expected, the appeals have grown steadily more numerous as the medical profession becomes thinned for military or naval purposes. Most of the medical men who were obviously free to take commissions have taken them, while a large number whom it is now sought to recruit can supply definite arguments for exemption. And it must be remembered that a certain proportion of them will later be rejected on physical grounds.

On Wednesday last the important piece of business before the Committee was the discussion of the actions taken, and to be taken, in accordance with the statement of the Director-General of National Service published in THE LANCET last week. Mr. Chamberlain, it will be remembered, said that it would be necessary "to see that the doctors are so mobilised and distributed that the needs of both the civil population and the Army can be met." It was reported at the meeting that an interview had taken place between certain members of the Central Medical War Committee and the Director-General of National Service on the subject of mobilisation of the medical profession as suggested by him in his general statement of his intentions. Mr. Chamberlain is now considering the terms of a communication laying the whole matter before members of the medical profession, and appealing to them to volunteer their services. It was felt by the Central Medical War Committee that the work which would fall upon it, should it receive a mandate to add to its previous activities others connected with the proposed general mobilisation of the profession, would necessitate addition to its central staff, and an interesting debate took place on the increase of the personnel of this staff. The great advantage which would result from strengthening the position of the Local Medical War Committees was insisted upon. There was a general feeling in the Committee that these local bodies were not always, or, perhaps, as a rule, used to the greatest advantage by the War Office, and that the War Office would greatly assist in the work of fair and adequate recruiting to meet the military needs of the country by ensuring that the medical military authorities in the various Commands at home should always be in close touch with the Local Medical War Committees for the districts within the area of each Command.

## BOOKS FOR BRITISH PRISONERS OF WAR.

The British Prisoners of War Book Scheme is the officially recognised medium for providing British prisoners of war with books for purposes of serious study. Those responsible for the working of the scheme are making urgent appeal for works on medical subjects to meet actual requests received from British prisoners, soldiers, sailors, and civilians, interned in enemy or neutral countries. Among the special books asked for at the moment are the following : "Diseases of Women" (Galabin), "Diseases of Children" (Goodheart and Still), "Materia Medica and Therapeutics" (Mitchell Bruce), "Medicine" (Osler), "Pharmacology" (Boumetz). All who can contribute one or more of the above works to this excellent War Charity are invited to forward to Mr. A. T. Davies, at the Board of Education, Whitehall, London, S.W., a list of the books they can offer. They will then be notified as to the acceptance of their gifts. Further particulars of the Book Scheme may be had on application.

**ARMY CANTEENS.**—The Army Canteens Committee has now assumed control of 1000 out of a total 1700 canteens in military barracks and camps, and negotiations are pending in regard to the remainder. Under the Committee's management the soldier will be the sole shareholder and 10 per cent. of the takings will be earmarked as an interim dividend for the canteen customers. Surplus profits are credited to the Central Regimental Institutes Fund from which £100,000 have already been given to the Star and Garter Hospital. The total annual turnover of the canteens at home is stated to be more than £15,000,000.

## Parliamentary Intelligence.

## NOTES ON CURRENT TOPICS.

*The Parliamentary Session and the War.*

Parliament met on Wednesday, Feb. 7th. It is devoting itself almost exclusively to the war and the problems arising out of it. The House of Commons has discussed various matters affecting the food-supply. A vote of credit of £550,000,000 has been granted in Committee of Supply, which it is expected will carry on the war until the end of May. The Chancellor of the Exchequer's statement revealed the fact that expenditure had now reached an average of £5,790,000 a day. He placed the expenditure from the beginning of the war at £4,200,000,000.

*Criminal Law Amendment Bill.*

Sir GEORGE CAVE, the Home Secretary, has given notice that at an early date he will introduce in the House of Commons a Bill "to make further provision with respect to the punishment of sexual offences and the prevention of indecent advertisements and matters connected therewith." It is stated that one of the provisions of the Bill will make the communication knowingly of venereal disease a criminal offence. The expectation is entertained that the Local Government Board will bring forward a Bill at a later day to suppress the treatment of venereal disease by quacks and "secret remedies."

*Army Medical Boards.*

On the House of Commons going into Committee of Supply on Army Estimates, Mr. NIELD will call attention to the action of medical boards in passing recruits for service. He proposes to move "that, in the opinion of this House, the classification of recruits for the Army by military medical boards, particularly of men who have been previously examined upon attestation under the Derby scheme and rejected as unfit, has been productive of great and unnecessary hardship as well as expense by reason of the large number of such men, while undergoing training, being found unable to perform the military work required of them in the class to which they have been assigned, whereby they have had to be sent for hospital treatment and have occupied accommodation and medical attendance urgently required for returned wounded men; and this House is of opinion that an inquiry is urgently needed to alter and standardise these medical examinations and to ascertain the extent to which hospital accommodation and expense have been expended which with proper care might have been avoided."

## HOUSE OF COMMONS.

## MONDAY, FEB. 12TH.

*Wounded Prisoners in Switzerland.*

MR. HUME WILLIAMS asked the Foreign Secretary what was the present state of the negotiations with Germany with reference to the mutual repatriation of prisoners interned in Switzerland; whether there was any hope that badly wounded prisoners would be exchanged; and, if so, when they might be expected to arrive home.—MR. J. F. HOPE (for the Foreign Secretary) answered : The German Government have not yet definitely accepted our proposal for the repatriation from Switzerland of prisoners of war with disabilities which have developed since their transfer to Switzerland.

*British Prisoners in Turkey.*

Answering MR. HUME WILLIAMS, MR. J. F. HOPE said : His Majesty's Government has repeatedly made the strongest possible representations to the Turkish Government with a view to obtaining permission for representatives of the United States Embassy to visit the camps where British prisoners of war are interned. Their efforts until now have been unsuccessful, but they are being and will be continued. In the meantime certain camps have been visited by delegates of the International Committee of the Red Cross, whose report has not yet been received. The information which has been reaching His Majesty's Government from diverse sources is to the effect that the conditions under which the officer prisoners of war are interned are tolerable, but the situation of the prisoners of other ranks is in general deplorable.

## TUESDAY, FEB. 13TH.

*"Manipulative" Surgery.*

In answer to a question whether some of the leading exponents of "manipulative surgery" had offered to give their services free to suffering soldiers and their offers had been rejected, MR. MACPHERSON (Under Secretary for War) said that the rule was quite clear. Any man who was not on the Medical Register was not eligible for the Royal Army Medical Corps. The care, attention, and skill which had

been bestowed by members of the latter on men of the Army had been received with approbation on all hands.

#### Tuberculosis Treatment of Naval Officers.

Answering Mr. BRUNNER, Sir EDWARD CARSON (First Lord of the Admiralty) said: Naval officers who are admitted into hospital with pulmonary tuberculosis contracted on service are treated in a naval hospital at the expense of the Admiralty, unless they wish to be treated in an outside institution, when they have to undertake their own cure and treatment and the expense of such treatment. They are not invalidated after 91 days' treatment, but at the expiration of this period their full pay ceases and they are put on half-pay. These regulations have recently been brought to my notice, and in my opinion are not satisfactory, and the question of an alteration in the regulations affecting the care and maintenance of these cases is now before the Board.

## Appointments.

*Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

LEWIN, S. (temp. Capt. R.A.M.C.), and LOWRY, C. G. (temp. Capt. R.A.M.C.), have been appointed Assistant Surgeons to the Limbless Hospital, Belfast.

STEELE, PATRICK, M.D. Edin., Medical Superintendent of Roxburgh District Asylum.

Certifying Surgeons under the Factory and Workshops Acts: ELLISON, H. B., M.R.C.S., L.R.C.P. Lond. (Frodsham, Cheshire); JONES, T., M.R.C.S., L.R.C.P. Lond. (Amlwch, Anglesey); and KNOX, J. B., M.B., C.M. Edin. (Esher, Surrey).

## Vacancies.

*For further information regarding each vacancy reference should be made to the advertisement (see Index). When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.*

APPLECROSS, PARISH OF ROSS-SHIRE.—Medical Officer, &c., for Torridon District. Estimated emoluments £350 per annum.

ASHTON-UNDER-LYNE, LANCS. DISTRICT INFIRMARY AND CHILDREN'S HOSPITAL.—Assistant House Surgeon. Salary £160 per annum, with usual emoluments.

BIRKINHEAD UNION INFIRMARY.—Junior Female Resident Assistant Medical Officer. Salary at rate of £300 per annum, with board, &c.

BOLTON INFIRMARY AND DISPENSARY.—Senior House Surgeon, Second House Surgeon, and also Third House Surgeon. Salaries £230, £200, and £180 per annum respectively, with board, &c.

BOURNEMOUTH, ROYAL VICTORIA AND WEST HANTS HOSPITAL.—Resident Medical Officer. Salary £250 per annum, with board, &c.

BRITISH RED CROSS HOSPITAL, Netley.—Two Medical Officers and One Surgeon

BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.

CARDIFF, KING EDWARD VII.'S HOSPITAL.—House Surgeon for six months.

DERBYSHIRE ROYAL INFIRMARY, Derby.—House Physician and Casualty Officer. Also Resident Anæsthetist. Salaries £200 per annum, with board, &c.

DORCHESTER, DORSET COUNTY COUNCIL.—Temporary Clinical Tuberculosis Officer. Salary £250 per annum.

DUNDRE DISTRICT ASYLUM.—Assistant Resident Medical Officer. Salary £200 per annum, with board, &c.

DUNDEE MATERNITY AND CHILD WELFARE SCHEME.—Medical Practitioner (Female). Salary £35 per annum.

EDINBURGH PARISH COUNCIL, CRAIGLOCKHART POORHOUSE AND HOSPITAL.—Assistant Medical Officer. Salary £250 per annum, with board, &c.

EVERLINE HOSPITAL FOR CHILDREN, Southwark, S.E.—House Physician. Salary at rate of £160 per annum, with board, &c.

GREAT YARMOUTH HOSPITAL.—House Surgeon, unmarried. Salary £200 per annum, with board, &c.

GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon. Salary £200 per annum, with board, &c.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.—House Physician for six months. Salary 30 guineas.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.—House Surgeon and Assistant Casualty Medical Officer. Salary at rate of £60 per annum, with board, &c.

KENNINGTON BOARD OF GUARDIANS INSTITUTION, Marloes-road.—Second Assistant Resident Medical Officer. Salary £160 per annum, with board, &c.

LEEDS PUBLIC DISPENSARY.—Resident Medical Officer. Salary £200 per annum, with board, &c.

MANCHESTER, BAGULEY SANATORIUM FOR TUBERCULOSIS.—First Assistant Medical Officer, unmarried. Salary £300 per annum, with board, &c.

MANCHESTER COUNTY ASYLUM, Prestwich.—Locum Tenens. Salary £7 7s. per week, with board, &c.

MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Park-place, Cheetham Hill-road.—Female House Surgeon. Salary £120 per annum, with board, &c.

MANCHESTER UNION, NELL LANE MILITARY HOSPITAL, West Didsbury.—Locum Assistant Resident Medical Officer. Salary £7 7s. per week, with board, &c.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, Bloomsbury.—Junior House Physician. Salary £150 per annum, with board, &c.

PORTSMOUTH ROYAL HOSPITAL.—House Surgeon for six months. Salary £250 per annum, with board, &c.

QUEEN CHARLOTTE'S LIVING-IN HOSPITAL, Marylebone-road, N.W.—Assistant Resident Medical Officer for four months. Salary at rate of £60 per annum, with board, &c.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford.—House Surgeon.

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.—Female Junior Obstetric Assistant. Salary £62 10s. per annum, with board, &c. Also to attend at Endsleigh-street Maternity Hospital. Salary £40 per annum.

ROYAL LONDON OPHTHALMIC HOSPITAL, City-road, E.C.—Third House Surgeon. Salary at rate of £50 per annum, with board, &c.

ST. MARK'S HOSPITAL, City-road, E.C.—House Surgeon. Salary as arranged, with board, &c.

ST. PETER'S HOSPITAL FOR STONE, &c., Henrietta-street, Covent Garden, W.C.—Junior House Surgeon for six months. Salary at rate of £75 per annum, with board, &c.

Salford Royal Hospital.—House Surgeon and Junior House Surgeon. Salaries at rate of £200 and £150 per annum respectively, with board, &c.

STAFFORDSHIRE EDUCATION COMMITTEE.—Female Assistant School Medical Inspectors. Salaries at rate of £400 per annum.

SUNDERLAND ROYAL INFIRMARY.—Female House Surgeon. Salary £150 per annum, with board, &c.

UNIVERSITY OF LONDON.—External Examiners.

VICTORIA HOSPITAL FOR CHILDREN, Tite-street, Chelsea, S.W.—Senior Resident Medical Officer. Salary £250 per annum, with board, &c.

WILLIMSDEN URBAN DISTRICT COUNCIL.—Temporary Assistant Medical Officer for the Health Department. Salary 28 8s. per week.

WINCHESTER, ROYAL HAMPSHIRE COUNTY HOSPITAL.—Resident Medical Officer. Salary as arranged, with board, &c.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notices of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Harefield and Rickmansworth.

## Births, Marriages, and Deaths.

### BIRTHS.

BLACKSTONE.—On Feb. 11th, at Westcliff-on-Sea, the wife of Leonard C. Blackstone, M.B., B.S., Temporary Lieutenant R.A.M.C., of a daughter.

CLARKE.—On Feb. 4th, at Belling-broke-grove, Wandsworth Common, the wife of Alexander Clarke, M.R.C.S., L.R.C.P., of a son.

MCGILLYCUDDY.—On Feb. 4th, at Compton-road, Wimbledon, S.W., the wife (née Lukey) of Captain R. H. McGillycuddy, M.C., R.A.M.C., of a son.

MURRAY-SHIREFF.—On Feb. 9th, at Whitley Cottage, Melksham, the wife of Cecil Murray-Shireff, L.D.S. R.C.S. Eng., of a daughter.

RIVETT.—On Feb. 10th, at a Nursing Home, to Louis Carnac Rivett, M.C., F.R.C.S., Clover Lodge, Dlike-street, Chelsea, and Mary (née R. wan)—a son.

STIHL.—On Feb. 10th, at Crescent-grove, Clapham, to Ruth, wife of Gavin Stihl, M.R.C.S., L.R.C.P., Temporary Captain R.A.M.C.—a daughter.

SUCKLING.—On Feb. 13th, at 5, Marine terrace, Margate, the wife of J. Jerome Suckling, M.B., B.S. Lond., of a daughter.

TINKER.—On Feb. 6th, at Bar Moor, Bletchingley, Surrey, the wife of F. Stanley Tinker, M.B., of a daughter.

### MARRIAGES.

BARKER—DAVIES.—On Nov. 4th, 1916, at St. Mary's Church, Quetta, Baluchi-stan, Captain H. L. Barker, I.M.S., to Jessie Gwendolyn, daughter of the late Daniel Davies, Ardigr-n, Wales.

MCREADY WORKMAN.—On Feb. 7th, at Downhill United Free Church, Glasgow, Captain Wilclf McReady, R.A.M.C., to Nellie B. Workman, youngest daughter of Mr. and Mrs. W. S. Workman, of University gardens, Glasgow.

TOWERS—HAK.—On Feb. 10th, at St. Thomas's Church, Edinburgh, Arthur Henry Towers, M.B., Ch.B., to Mila, only daughter of G. A. Hake, Lloyd's Register of Shipping, and Mrs. Hake, Leith.

YOUNG—BROUGH.—On Feb. 10th, at Holy Trinity Church, Southport, Captain William Francis Young, R.A.M.C., to Blanche Craig, youngest daughter of William Nelson Brough, of Liverpool and Southport.

### DEATHS.

HUTTON.—On Feb. 10th, at Weydown, Haslemere, H. R. Hutton, M.B. Cantab., aged 63 years.

KEATES.—On Feb. 7th, Courtney Cooper Keates, late Captain, R.A.M.C., aged 32 years.

SETON.—On Feb. 8th, at Onslow-road, Richmond, David Elphinstone Seton, M.D., in his 90th year.

SKINNER.—At Bridge of Allan, N.B., on Feb. 6th, Colonel Johnston Shearer, C.B., D.S.O., Indian Medical Service (retired), 10, Royal-terrace, Queen's Park, Glasgow.

WOON.—On Feb. 8th, at Dunbar, Russell Elliott Wood, M.B., C.M., F.R.O.S.E., Lieutenant-Colonel, R.A.M.C., Yeomanry, aged 62 years.

Mr. Percival Turner, of 4, Adam-street, Strand, regrets to announce the death, on Wednesday, Feb. 14th, of Miss Page, his trusted secretary, who was well known to his clients for over 21 years.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

## Notes, Short Comments, and Answers to Correspondents.

### THE INVENTOR OF QUICK-FIRING GUNS.

IT must be more or less an accident that we have not got in early English history ample accounts of gunshot wounds. The quick-firing hand gun seems to be such a modern invention that it is curious to find that it is really 400 years old and that a King of England so closely connected with medical men as Henry VIII. should have been interested in the invention. In the little-known "Chroniques des Iles de Jersey, Guernsey, Aurgeny et Sark," it is related how—

Hellier De Carteret, Bailli de la dite Isle de Jersey, se transporta vers le Roy Henry VIII., auquel il remontra lo grief et injure que le dit Sire Hugh Vaughan, Capitaine de la dite Isle, luy avoit faite en Cour sainte, et comment le Roy luy confirma sa patente, touchant son office de Bailli soubs le Grand Seigneur d'Angleterre durant sa vie, et aussy le fist son Serviteur et Escuier tranchant, dont le dit Bailli fut sermenté solennellement aussy qu'en tel cas est requis et accoutumé. Et avecq ceulo le Roy donna congé et license ad dit Bailli, de tirer tant de la harquebuse que de l'archibaleste en quelque endroit que ce fust en tout le Royaume d'Angleterre, tant au gibier que es bestes sauvages sans aucunement en estre réprimé ni destourbé d'aucun durant sa vie; et de ce, luy en fis bonne assurance soubs son privé signe. Et fut le dit Sire Hugh Vaughan, Capitaine comme dit est, envoyé querir par un Herault d'armes en toute haste.

This giving by the King of a licence to use the harquebuse—the original hand-gun—was an exceptional privilege, as the British archers were thought highly of and encouraged.

The next few lines relate the invention by Hellier De Carteret of a quick-firing harquebuse, which would also aim in two directions at the same time, and King Henry VIII.'s interest therein. The greatest improvements in the harquebuse are generally credited to Filippo Strozzi, an Italian, in the year 1530.

Le dit Bailli estant aussy parvenu en la faveur du Roy par le moyen des Seigneurs du Conseil, et aussy que le Roy se délectoit fort à tirer tant de l'archibaleste que de la harquebuse, pouvoit ordinairement aller avecq le Roy quand il alloit tirer en quelqu'un de ses Parcs justes bestes sauvages ou autre gibier; et mesmement pour autant que le dit Bailli avoit trouvé une invention de tirer de la harquebuse 5 on 6 traits de bouleil l'un après l'autre et à plusieurs marques toutes d'une même charge l'une avant l'autre et d'un mesme feu, et aussy de son arba esto tirer deux vires tout d'un coup, l'une d'une voye et l'autre de l'autre et à deux marques. Le Roy voulut sevoir et apprendre la dite invention et l'expérimenter et pratiquer luy-mesme, à quel il y print un fort grand plaisir, tel ément que le dit Bailli fut de plus en plus en la bonne grace et faveur du Roy.

The wounds produced were so severe that a distilled aromatic spirituous liquor termed "harquesbusade" came into use for treating the shot wounds, and its composition was altered from time to time according to experience or fancy. The Seigneurs of St. Ouen, Jersey, have for so long a time been named De Carteret, that Philippe De Carteret who was the Seigneur in 1535 was the fifty-ninth Seigneur of St. Ouen, and the claim has been made that it would be difficult to find a race so old and direct in any kingdom.

### TEASPOONFUL MEASURES OF FOODS.

To the Editor of THE LANCET.

SIR,—In these days of food shortage we are all concerned with the measures and weights of foods. I have been interesting myself in discovering how many teaspoonfuls are contained in the avoirdupois pound of the following ordinary household foods and in some cases how many pieces to the pound. I find as follows, with a teaspoon measuring 97 teaspoonfuls to the pint (not a standard drachm):—

Tea .. . . . .	112	teaspoonfuls to the lb.
Cocoa .. . . . .	56	" "
Coffee beans .. . . . .	161	" "
Lump sugar .. . . . .	63	lumps (tenbes) ..
White granulated sugar .. . . . .	48	teaspoonfuls ..
Yellow crystals (moist) .. . . . .	36	" "
Rice .. . . . .	48	" "
Tapioca .. . . . .	64	" "
Scarlet haricot beans .. . . . .	48	" "
(Sift every dry) .. . . . .	44	" "
Flour .. . . . .	69	" "

(1602 beans).

From the above figures some deductions may be made. For instance, one pound of tea at 2s. 4d. lb. will make 112 cups. That is exactly one farthing per cup; and with two lumps of sugar at 6d. lb. (15 cubes for lb.) equals one-sixth of a penny; and with milk at 3d. a pint, three teaspoonfuls per cup equals one-tenth of a penny; total, a very small fraction over a halfpenny per cup (not including cost of gas for heating the water). It also shows that damp yellow crystal sugar (so-called "Demerara") heaps on the spoon and is not so economical as white crystals at the same price. It also shows that five lumps (tenbes) equals three teaspoonfuls of granulated sugar. The pound of haricots measured a pint,

and was bought at the grocer's. A pint of "butter beans" weighed only 13½ ounces, and there were 310 beans. A pound would have been 365 beans. The cost was the same—viz., 5d.—but the butter beans were bought at the cornchandler's, where measure and not weight is the rule. Other deductions may be made at pleasure.

I thought these measurements might interest your readers. The point to be remembered is that the exact size of the teaspoon must be arrived at first by the measure of its water contents, as a "teaspoon" is not a standardised measure.

I am Sir, yours faithfully,

London, Feb. 9th, 1917.

OBSERVER.

### THE SPRINGS OF THE MOTOR-CAR.

WE have received some letters from correspondents who depend upon their motors to get through their work and who are having unwanted trouble with the springs of their cars. Doubtless the present condition of the roads is not conducive to the life of any spring on any vehicle, but it is also a fact that though most owners, especially if also drivers, see to the lubrication of their engines, they rarely think of the condition of the springs. Springs are made of a certain number of laminations, the number depending on the weight of the car. As a result of their position they are exposed to a great amount of wet, with the inevitable result that rusting may set in and ultimately prevent the natural sliding movements of the leaves, so defeating the very purpose for which the springs were originally designed. The remedy is simple and thorough—it is also a troublesome one. It is to take the springs down occasionally and dismantle and grease each member separately. This operation is not generally done by any owners or drivers, with the consequence of occasional fractures and certainly less comfort in riding. "Messrs. Brown Brothers, Limited, of 15, Newman-street, London, W., have introduced spring gaiters, which cover the springs, retain grease, and ensure the constant lubrication which is essential to the action and life of this much-neglected member of the car's anatomy," writes a frequent correspondent on motoring, adding that he "is of opinion that the use of these gaiters will prevent to a great extent any trouble with springs."

### A CONUNDRUM IN RATIONS.

A LIFEBOAT containing 50 souls is afloat far from land; the probabilities are that it will not be picked up, but that it can reach land at the end of 14 days. The occupants of the lifeboat comprise: 5 A.B. sailors including, as an A.B., the ship's doctor, who takes command; 10 men passengers, of whom 4 are invalid; 15 women, of whom 3 are "as strong as men"; 20 children. The provisions in the boat are as follows: one puncheon of water, one anker of rum, 400 lb. of bread, 250 lb. of meat, 75 lb. of sugar.

The doctor decides at once to ration these provisions. What scale will give him the best chance of bringing his charge to land without loss of life?

### A CENTENARIAN DESCENDANT OF OLD PARR.

A RECENT issue of *The Friend* contains some interesting particulars of Sarah Ann Alexander, of Reigate, who completed her 100th year on Jan. 15th. She is the last survivor of a long-lived family of eight brothers and sisters, one of whom died at the age of 103, the ages of the others varying from 88 to 93 years. Her mother's family claimed descent from Old Parr, who died at the age of 152. The portrait of Miss Alexander, when aged 100, shows a fine type of old age. In the same paper the death is announced, at the age of 105, of Elizabeth Tozell McCoy, of Bloomington, Indiana, another member of the Society of Friends.

### EDIBLE SEAWEED.

To the Editor of THE LANCET.

SIR,—Referring to your interesting note in THE LANCET of Feb. 10th on "Edible Sea Plants," it may interest you to know that in East Anglia "samphire" is eaten; but on investigation this proves to be not the true samphire, but *Salicornia herbacea* (Chenopodiace); it grows on the salt marshes about here, and is pickled for eating.

I am, Sir, yours faithfully,

Melton, Suffolk, Feb. 12th, 1917.

JAMES R. WHITWELL.

### CHILD WELFARE CHARTS.

We have received from the secretary of the National League for Physical Education and Improvement a specimen of a very practical chart (1s. per dozen, 6s. per 100) for recording the weight of the child during the first 5 years of life. In the first year the record is weekly, in the second monthly, and in the third to fifth inclusive quarterly. The course of normal weight is indicated. Two useful wall charts are also issued (20 x 30 in., price 2s. post-free): one indicating the dangers of the "comforter," the other showing graphically the hours of sleep desirable at different ages. The charts should be of real help to welfare workers, and may be obtained from the offices of the National League, 4, Tavistock-square, London, W.C.

## Medical Diary for the ensuing Week.

### SOCIETIES.

**ROYAL SOCIETY**, Burlington House, London, W.

THURSDAY.—Papers:—Mr. S. A. Smith: The Fossil Human Skull found at Talgal, Queensland (communicated by Prof. G. E. Smith).—Dr. C. Chree: The Magnetic Storm of August 22nd, 1916.—Prof. W. H. Young: On the Ordinary Convergence of Restricted Fourier Series.

**ROYAL SOCIETY OF MEDICINE**, 1, Wimpole-street, W.

#### MEETINGS OF SECTIONS.

Tuesday, Feb. 20th.

**GENERAL MEETING OF FELLOWS**, at 5 p.m.  
Ballot for Election to the Fellowship.  
(Names have already been circulated)

**THEAPEUTICS AND PHARMACOLOGY** (Hon. Secretaries—W. Langdon Brown, Philip Hainill, J. Gordon Sharp): at 4.30 p.m.  
*Paper:*

Dr. Stansfeld: The Principles of Treatment by Transfusion of Blood.

Wednesday, Feb. 21st.

**HISTORY OF MEDICINE** (Hon. Secretaries—J. D. Rolleston, Charles Singer): at 5 p.m.  
*Exhibition of Portraits, Books, &c.* (at 4.30 p.m.).

*Paper:*  
Dr. R. Hingston Fox: The Medical Practice of Dr. John Fothergill (1740–1780).

Friday, Feb. 23rd.

**STUDY OF DISEASE IN CHILDREN** (Hon. Secretaries—A. S. Blundell Bankart, E. A. Cockayne, C. P. Lapage): at 4.30 p.m.  
*Cases:*

Dr. J. Porter Parkinson: Case for Diagnosis.

Dr. T. R. Whipham: (1) Precocious Sexual Development; (2) Frigilitas Femina.

#### Pathological Specimens:

Dr. Eric Pritchard:

Dr. E. A. Cockayne: Case of Defect of Duodenum.

*Short Papers:*  
Mr. J. S. Kellett Smith: Some Points in Lateral Curvature of the Spine.

Dr. F. Parkes Weber: Lipodystrophy Progressiva.

**EPIDEMIOLOGY AND STATE MEDICINE** (Hon. Secretaries—William Butler, M. Greenwood, jun.): at 8.30 p.m.  
*Paper:*

Mr. A. W. Bacot (Lister Institute): The Louse Problem.  
The discussion will be opened by Professor G. H. V. Nuttall, F.R.S.

**ROYAL SOCIETY OF ARTS**, John-street, Adelphi, W.C.

MONDAY.—4.30 p.m., Cantor Lecture:—Prof. A. B. Pite: Town Planning and Civic Architecture. (Lecture IV.)

**ILLUMINATING ENGINEERING SOCIETY**, House of the Royal Society of Arts, John-street, Adelphi, W.C.

TUESDAY.—5 p.m., Dr. J. Kerr: The Effect on the Eye of Varying Degrees of Brightness and Contrast.

**LONDON DERMATOLOGICAL SOCIETY**, St. John's Hospital, 49, Leicester-square, W.C.

TUESDAY.—5 p.m., Paper:—Dr. C. Kempster: The Action of X Rays upon Diseases of Bacterial Origin.

**ROYAL MICROSCOPICAL SOCIETY**, 20, Hanover-square, W.

WEDNESDAY.—Dr. A. H. Drew and Dr. Una Griffin: Parasitology of Pyorrhœa.

### LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

**ROYAL COLLEGE OF PHYSICIANS OF LONDON**, Pall Mall East.

THURSDAY.—5 p.m., Milroy Lectures:—Dr. W. J. Howarth: Meat Inspection, with Special Reference to the Developments of Recent Years. (Lecture I.)

**ROYAL COLLEGE OF SURGEONS OF ENGLAND**, Lincoln's Inn Fields, W.C.

MONDAY AND WEDNESDAY.—5 p.m., Hunterian Lectures:—Prof. R. H. Elliot: Couching for Cataract in India.

**POST-GRADUATE COLLEGE**, West London Hospital, Hammermith-road, W.

MONDAY.—2 p.m., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 p.m., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 a.m., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 p.m., Medical and Surgical Clinics. X Rays. Mr. Partoe: Operations.

THURSDAY.—2 p.m., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 a.m., Dr. Simson: Gynaecological Operations. 2 p.m., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 a.m., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 p.m., Medical and Surgical Clinics. X Rays. Mr. Partoe: Operations.

**ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN**, 49, Leicester-square, W.C.

THURSDAY.—6 p.m., Chesterfield Lecture:—Dr. M. Dockrell: The Papular Eruptions.

**ROYAL INSTITUTION OF GREAT BRITAIN**, Albemarle-street, Piccadilly, W.

TUESDAY.—3 p.m., Prof. C. S. Sherrington: Pain and its Nervous Basis. (Lecture VI.)

**ROYAL INSTITUTE OF PUBLIC HEALTH**, Lecture Hall of the Institute, 37, Russell-square, W.C.  
Course of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—

WEDNESDAY.—4 p.m., Lecture VI.:—Dr. T. D. Lister: The Tuberculosis Problem in War Time. Dr. T. D. Acland, Dr. T. N. Kelynack, and Dr. C. Wall have promised to take part in the discussion.

### EDITORIAL NOTICES.

It is most important that communications relating to the Editorial business of THE LANCET should be addressed exclusively "To the EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.

We cannot prescribe or recommend practitioners. Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

Offices: 423, STRAND, LONDON, W.C.

### MANAGER'S NOTICES.

#### VOLUMES AND CASES.

VOLUMES for the second half of the year 1916 will be ready shortly. Bound in cloth, gilt lettered, price 16s., carriage extra.

Cases for binding the half-year's numbers (inland edition) are now ready. Cloth, gilt lettered, price 2s., by post 2s. 4d. To be obtained on application to the Manager, accompanied by remittance.

#### ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the new year, the price was raised to 8d. The rates of subscription remain as revised in October.

#### INLAND.

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#### TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C., are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and not to THE LANCET Offices.

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Advertisements (to ensure insertion the same week) should be delivered at the Office not later than Wednesday, accompanied by a remittance.

## METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Feb. 14th, 1917.

Date.	Rain-fall.	Solar Radio in Vaono.	Maxi- mum Temp. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Remarks.
Feb. 8	...	57	36	24	28	28	
" 9	...	59	39	25	27	27	Fine
" 10	...	44	37	27	33	34	Fine
" 11	...	45	38	34	34	35	Overcast
" 12	...	43	39	34	34	35	Overcast
" 13	...	50	42	35	36	37	Overcast
" 14	...	47	39	34	33	35	Fine

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

The following journals, magazines, &c., have been received:—

West London Medical Journal, Journal of Laryngology, Rhinology, and Otology, Public Health, Annals of Tropical Medicine and Parasitology, Revue d'Hygiène, Canadian Medical Association Journal, Dominion Medical Monthly, New Zealand Medical Journal, Birmingham Medical Review, Canadian Practitioner and Review, Journal of Pathology and Bacteriology, Revista Clínica.

## Communications, Letters, &amp;c., have been received from—

- A.—Ashton under Lyne District Infirmary, Sec.-Supt. of; Capt. A. S. K. Anderson; Messrs. Allen and Hanburys, Lond.; Dr. H. G. Adamson, Lond.; Capt. D. C. Aikenhead, C.A.M.C.; Messrs. Arnold and Sons, Lond.; Mr. S. F. d'Azavedo, Foz do Douro; Mr. R. J. Albery, Lond.; Capt. A. G. Anderson, R.A.M.C.; Admiralty, Medical Department, Director General of.
- B.—Mr. H. W. Baity, Ventnor; Lieut.-W. Buchanan, R.A.M.C.; Dr. N. W. Buchanan, Peterborough; Mr. L. Belson, Lond.; Messrs. Balc. Sons, and Danielsson, Lond.; Miss E. Bailey, Lond.; Messrs. T. B. Browne, Lond.; Messrs. Burroughs Wellcome and Co., Lond.; Bolton Infirmary and Dispensary, Sec. of; Messrs. Butterworth and Co., Lond.; Birkenhead Guardians, Clerk to the; Boston (U.S.A.) Medical Library, Asst. Librarian of; British Journal of Ophthalmology, Lond., Editor of; Dr. W. Langdon Brown, Lond.; Blinded Soldiers' and Sailors' Hostel Care Committee, Lond., Chairman of; Messrs. Charles Butterworth, Lond.
- C.—Miss H. Chick, Lond.; Colonial Office, Lond.; Miss M. M. Chalwin Buckhurst Hill; Dr. S. Coupland, Lond.; Dr. W. M. Croton, Dublin; Dr. J. R. T. Conner, Lond.; County Asylum, Rainham, Medical Supt. of; Surg. G. Cochran, R.N.; Dr. J. C. Connell, Kingston, Ontario, Capt. C. Clarke, R.A.M.C.; College of Preceptors, Lond., Sec. of; Mrs. Clarke, Hoddesdon; Mr. H. A. Collins, Croydon; Messrs. Cowie and Co., Lond.; Mr. C. P. Carver, Torquay; Mr. F. H. Cooke, Dovercourt; Mr. R. Coombe, Exeter; Messrs. J. and A. Churchill, Lond.; Capt. A. H. Campbell, C.A.M.C.; Commission of Conservation, Ottawa, Asst. Chairman of.
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- and Stoughton, Lond.; Mr. H. A. Fenton, Lond.; Dr. H. C. Fuller, Malvern; Dr. H. M. Fletcher, Lond.; Foreign Press Office, Barcelona; Messrs. Fairchild Bros. and Foster, Lond.
- G.—Glasgow, Town Clerk of; Dr. D. Guthrie, Lond.; Mr. J. J. Grace, Lond.; Mrs. Greenwood, Lond.; Dr. M. Guttelung, Utrecht.
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- I.—Insurance Committee for the County of London; Messrs. I. Isaacs and Co., Lond.; Illuminating Engineering Society, Lond.
- J.—Dr. W. Jones, Alexandria; Mr. B. L. Jones, Great Malvern; Dr. F. H. Jacob, Nottingham; The Johns Hopkins Hospital Library, Baltimore, Librarian of; Dr. H. L. Jones, Cambridge.
- K.—Mr. J. A. Kyle, Brwarton; Lieut. R. M. Kharegat, I.M.S.
- L.—Dr. T. M. Legge, Lond.; Dr. R. H. Lord, Colwyn Bay; Mr. A. Lovell, Lond.; Messrs. H. K. Lewis and Co., Lond.; Local Government Board, Lond., Sec. of; Dr. A. S. Leyton, Leeds; Leeds Public Dispensary, Sec. of; Mr. A. Lupton, Lond.
- M.—Dr. W. S. Moore, Blackley; Major R. McCarron, I.M.S.; Dr. J. L. Martin, Swanage; Messrs. H. A. Muron, Newcastle-on-Tyne; Manchester Northern Hospital, Sec. of; Dr. H. E. Maunsell, Kingston, Jamaica; Medical Society of County of Kings (U.S.A.), Brooklyn, Librarian of; Dr. Flor Murray, Lond.; Mr. S. J. Mathewson, Lond.; Ministry of Munitions of War, Intelligence and Record Section, Director of; Maitine Manufacturing Co., Lond.; Mr. J. E. May, Lond.; "M.O."; Capt. G. Marshall, R.A.M.C.; Manchester Guardians, Clerk to the; Dr. Dan McKenzie, Lond.
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- R.—Mr. J. R. Rolston, Plymouth; Royal Society of Arts, Lond.; Royal Academy of Medicine in Ireland, Dublin; Rockefeller Institute for Medical Research, New York; Rotherham Hospital and Dispensary, Sec. of; Messrs. Robertson and Scott, Edinburgh; Mr. D. D. Robertson, Lond.; Messrs. Reynell and Son, Lond.; Surg.-Gen. H. D. Rolleston, C.B.; Royal Hampshire County Hospital, Winchester, Sec. of.
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- Z.—Dr. S. Zavadier, Lond.
- Letters, each with enclosure, are also acknowledged from—
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## Hunterian Lecture

ON

### DUPUYTREN'S CONTRACTION OF THE PALMAR FASCIA: DUPUYTREN'S LIFE AND WORKS.

*Delivered at the Royal College of Surgeons of England on Feb. 12th, 1917,*

BY J. HUTCHINSON, F.R.C.S. ENG.,

HUNTERIAN PROFESSOR AND EXAMINER IN SURGERY TO THE COLLEGE; SENIOR SURGEON TO THE LONDON HOSPITAL.

MR. PRESIDENT AND GENTLEMEN.—In long-standing and severe cases of Dupuytren's contraction, certainly all those in which the affected digits are rigidly bent into the palm, the surgeon who trusts to the operations hitherto in vogue will be disappointed. Whether he divides or excises the palmar fascia he cannot straighten the contracted finger by manual force, still less can he trust to this being effected by subsequent splint-pressure, however prolonged.

#### CAUSATION OF CONTINUED CONTRACTION AFTER OPERATION.

What is it that prevents extension of the contracted fingers after the fascia has been thoroughly divided or excised? Obviously the skin will not account for this failure, and there are three other possible explanations:—

1. The one most generally assigned is a consecutive contraction of the flexor tendons. These have often been divided in the vain hope that the resistance would then be overcome. But it is easy to prove, without this useless test, that the fault does not lie in the tendons, for full flexion of the wrist or metacarpo-phalangeal joints makes no difference at all. This is conclusive, as thereby we relax thoroughly both flexor profundus and sublimis.

Before Dupuytren discovered the real cause of the contraction, which ever since has borne his name, the view chiefly held was that the flexor tendons were to blame, and it is curious to find traces of this exploded view surviving still. Nothing is, however, more certain than their innocence of any share in producing or keeping up the deformity, except that slight flexion of the fourth and fifth digits at the first interphalangeal joint is the normal position of rest. The possible relation of this fact to Dupuytren's contraction is discussed later.

2. Intra-articular adhesions in the metacarpo-phalangeal and interphalangeal joints of the contracted fingers might be invoked as the cause of the resistance, especially by those who see a close relation between this condition and gout or rheumatism. The idea of the existence of these adhesions is also favoured by the grave danger of stiffening of the fingers during the splint-treatment ordinarily pursued after operation, a danger which can hardly be impressed too strongly.

It would be difficult to disprove the theory of adhesions in the finger-joints without the aid of the X rays. But reference to Fig. 4, which may be taken as a typical instance of Dupuytren's contraction, shows a perfectly smooth articular surface in each joint. In the specimens I have obtained by operation (excision of the first inter-

phalangeal joint) the joint surfaces were always found to be normal. Both the explanations suggested are therefore seen to be groundless. The true reason is that, owing to the second phalanx being extremely flexed so that its base is pressed against the neck of the first phalanx, and, owing to this position being kept up during many months or years, the glenoid ligament in front of this joint, as well as the lateral ligaments, become shortened and incapable of extension.

#### TREATMENT.

The only way to overcome this obstacle is to excise the head of the first phalanx. Briefly the method is as follows:—

1. Through a palmar incision the bands of contracted and thickened fascia are dissected out, including their prolongations in front of the first phalanx (the best form of incision will be discussed later). The palmar wound or wounds are closed with the finest black silkworm-gut. The finger still remains flexed at the first interphalangeal joint.

2. The hand is turned over so that the dorsal surface is uppermost, a semilunar incision is made over the first interphalangeal joint, the extensor tendon divided, the head of the first phalanx cleared to its neck, the latter cut across and the head dissected out.

3. The extensor tendon is slightly shortened and its two ends united, preferably with fine kangaroo tendon or Japanese silk, and the small dorsal incision (which is, of course, quite separate from the palmar one) is then sewn up. The finger should now become perfectly straight (or nearly so) without any tension whatever.

4. No splint is required in the after-treatment, the gauze dressing is a sufficient support, gentle active and passive movements should be resorted to within the first few days. *No digit should be allowed to stiffen.*

I attach equal importance to two points—namely, the excision of the first phalangeal head and the avoidance of the prolonged and irksome splintage usually resorted to. The latter has been responsible, as will be illustrated later, for many stiff fingers and hands following the orthodox operations, and I believe it is to some extent also responsible for the well-known tendency to recurrence of the contraction after them.

The following case illustrates how excellent a result can be obtained by the method advocated without the employment of any splint in the treatment from beginning to end, formed at the site of the excision.

The patient was a man, aged 54. His right little finger was alone affected, but was bent right into the palm. I dissected out the band of palmar fascia thoroughly, but found it impossible to alter the deformity materially. I then excised the head of the first phalanx, shortening the extensor tendon and uniting it by fine kangaroo-tendon sutures. The finger came practically straight without tension; aseptic dressings were applied without a splint.

He was back at work very soon, and Figs. 1 and 2 show in a perfectly unbiased way the result several months later. The upper figure shows his hand in voluntary extension; the little finger is the least bit bent at the two digital joints, but this is no more than is habitual with many people who possess normal hands. In fact, it may be termed a normal position of rest for the little finger.

In flexion it will be noticed (Fig. 2) how good is the movement at the new joint; his grip was strong in all the fingers. Practically no sign of the small dorsal scar could be detected,

the palmar one was very inconspicuous. Here I would note that in some cases where forcible stretching of the finger has had to be employed by the surgeon during and after his operation the palmar scar becomes thick, disfiguring, and uncomfortable when the patient uses his hand. The well-known pathological law is illustrated that intermittent pressure and irritation of tissues always cause hypertrophy. It is just this hypertrophy that we have to dread and avoid in our treatment of Dupuytren's contraction.

The photograph shows the very slight degree of shortening of the digit produced by excision of the first phalangeal head. The normal relative length of the different digits is variable and of no importance. A slightly shortened but thoroughly useful finger is a very different thing from a stiffened and useless one.

It must not be claimed that a perfect result, functional and cosmetic, can be obtained in every case of Dupuytren's contraction, owing to the extreme length of time which is sometimes allowed to elapse before operative aid is sought. This point is illustrated by the following case.

A man, aged 54, was treated for Dupuytren's contraction of the ring finger, of no less than 10 years' duration. (Fig. 3.) Excision of the band of palmar fascia made no difference to the deformity. I then removed the head of the first phalanx and the finger came straight. But though the deformity was thus removed, the other two joints had stiffened during their 10 years' rigidity, and a perfect functional result could not therefore be obtained.

#### HISTORY OF VARIOUS METHODS OF TREATMENT.

A few words must be devoted to the history of the various methods of treatment in Dupuytren's contraction. Prior to the publication of the French surgeon's accurate pathological account of the disease in his "Leçons Orales" (vol. i., 1832) there was no treatment worth mentioning for the condition. Thus, Sir Astley Cooper simply referred to it as incurable. Dupuytren, having proved that the palmar fascia was to blame, advocated open transverse division of the fascial bands, the wounds being allowed to heal by granulation. Three cases only are described in his account; they were said to have been cured, but no surgeon at the present time would employ this method or hope for a cure to result from it.

Then came, with the wide use of tenotomy for club-foot, &c., the introduction of the subcutaneous division of the fascia in Dupuytren's contraction. This required many operations and laborious treatment with special splints applied to the fingers. Mr. William Adams's name is to be associated with the subcutaneous method, which is still employed by some surgeons; in slight cases it may meet with success. Following Lord Lister's great discoveries, the open excision of the fascial bands naturally came into vogue, and must of necessity continue to form a chief part in the treatment. Such attempts to cure the deforming contraction as the use of X rays, fibrolysin, ionisation, short-circuiting intestine for imaginary stasis, &c., need not be described here; they are quite useless.

As regards the open excision of the fascia we may admit that in early cases it attains a good result. But in long-standing ones where the contraction is very pronounced I contend that this method, however carefully performed, leaves a good deal to be desired; it is far from perfect.

1. It is impossible by it alone to straighten the bent finger; indeed, sometimes the degree of flexion remains the

same as before, and the surgeon may be driven to amputate the digit.

2. Following the operation a prolonged and irksome splint-treatment is always advocated, and in the subjects of Dupuytren's contraction stiffening of the digits and hand is very apt to occur as a result. If any splint be employed it should only be for a few days whilst the wound is healing, and it is best to remove it daily so that the digits concerned should be gently bent.

Let the surgeon remember that stiffness of the fingers resulting from his treatment may prove a worse evil than their original contraction. As a rule the patient only submits to operative measures when the finger is bent strongly into the palm, when the deformity has lasted a long time, and at this stage the question of consecutive changes in the ligaments of the finger-joints becomes as important as the contraction of the fascia.

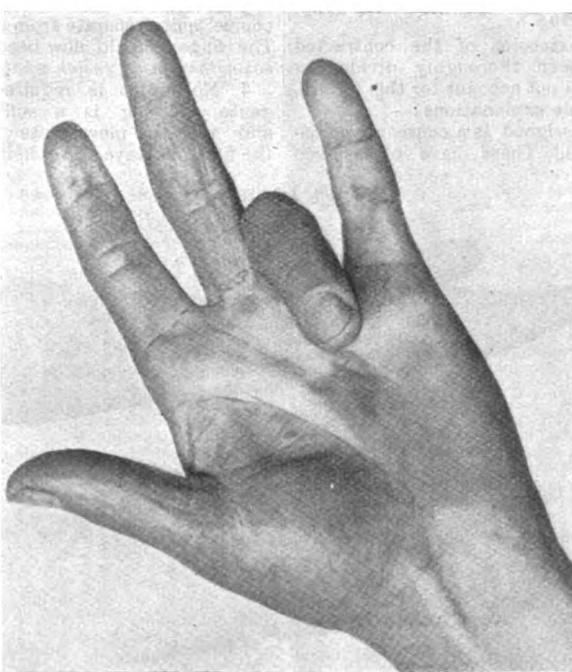
#### ANATOMY AND PATHOLOGY.

Strange to say, the current teaching as to the joint most concerned is quite wrong. To quote one of the most recent writers on the subject.

The forced flexion of the finger concerns solely the metacarpo-phalangeal joint. .... If one tries to extend the first phalanx one makes the cord project forwards which ties it to the hollow of the palm. The second phalanx is equally flexed on the first, the third is in a position intermediate between flexion and extension, but these last two segments allow of easy extension and have preserved all their freedom and integrity of passive motion.<sup>1</sup>

As will be shown directly, almost every particular dictum in this account, taken from the best French text-book, is untrue. A German writer<sup>2</sup> states more vaguely that in Dupuytren's contraction "the bending commences in the metacarpo-phalangeal joint and later involves the lower ones."

Similar views from English works could be readily quoted; in fact, the universal opinion prevails that as contraction of the palmar fascia would naturally be expected to involve flexion of the metacarpo-phalangeal joint, therefore it alone need be considered. It has not occurred to surgeons to test these views by X ray photographs. Fig. 4 is taken from an exact tracing of one



The contraction is seen to involve the first interphalangeal joint entirely. (See text.)

(made by my friend, Dr. Gilbert Scott, at the London Hospital). It shows the little finger of each hand of a man in whom Dupuytren's contraction was symmetrical and concerned only the fifth digit. The lowest interphalangeal joint (C) is in full extension, the metacarpo-phalangeal one (A) is slightly bent (about 40 degrees), whilst the joint between the first and second phalanges is bent to the utmost possible extent (a full right angle). The base of the second phalanx is seen to be pressed against the neck of the first one; no further flexion could occur. In front of each last phalanx slight bony irregularity will be noticed, and in one finger (D in the upper figure) this outgrowth of bone forms an eminence in front of the second phalangeal shaft. Such outgrowths or irregularities are common in the fingers of working men, and are to be ascribed more to hard use of the tendons than as proving a relation (often wrongly asserted) between Dupuytren's contraction and osteo-

<sup>1</sup> Maclaire on Dupuytren's Contraction, Le Dentu and Delbet Traité de Chirurgie, xxxiii., 127.

<sup>2</sup> Sultan, Spéciale Chirurgie, ii., 415.

arthritis. It will be noticed that in this typical X ray picture the actual joint surfaces are perfect.

It is somewhat difficult to explain why in Dupuytren's contraction it is the first interphalangeal joint that is the important one, though it is easy to see why the last one should escape, for the palmar fascia sends no fibres down so low as that. I may suggest that in the normal hand at rest extension is the usual position of the first and last joints, whilst at the second joint (the first interphalangeal one) flexion is habitual. Granting that the lowest slips of hypertrophied palmar fascia reach down in front of this latter joint, we may conclude that its usual position of flexion becomes readily exaggerated as Dupuytren's contraction commences and progresses.

At any rate, whatever the explanation may be, Mauclaire's description of the pathology is quite mistaken. It is the first interphalangeal joint which is most affected by the contraction, and it is this joint (so far from "preserving its freedom and integrity of movement") which in long-standing cases is found to offer an invincible obstacle to the finger being rectified after the fascia has been divided or excised.

It has, I hope, been conclusively shown that in Dupuytren's contraction the site of greatest flexion is the first interphalangeal joint, and it is a remarkable fact that the palmar fascia in its normal state is not described as reaching nearly so low as this. In the long account and numerous illustrations of the palmar fascia given by Testut<sup>3</sup> the lowest point to which the fibres are traced is the base of the first phalanx on its dorsal aspect. Practically the whole fascia ends at the level of the web. In other words, according to Testut, the human hand does not possess any fibrous bands going to the fingers which by their hypertrophy and shortening could possibly produce flexion of the first joint. Yet this is without doubt most contracted in this disease. Professors D. J. Cunningham and Merkel in their treatises on Anatomy, Poirier and Charpey in their voluminous account of the fascia, are equally silent on the subject. The last-named authors note that a few longitudinal fibres may be traced to "the level of the highest furrow across the fingers where they end in the skin." This point is at least an inch above the joint concerned. It is noteworthy that Dupuytren's observations have led anatomists to investigate and describe the palmar fascia with especial care and that the smallest fasciculi of it have been followed out.

In an excellent dissection of the palmar fascia in the Royal College of Surgeons Museum some delicate fibrous bands are shown in front of the first phalanx, chiefly attached to its sides, but even if these were hypertrophied and shortened they could not produce flexion of the second phalanx. Yet clinical experience shows there is actually a firm band of fibrous tissue running down in front of the first interphalangeal joint, which is responsible for the chief deformity and which should always be dissected out in the open operation. We must, therefore, admit that in Dupuytren's contraction the thickening does not limit itself to the normal anatomical bands, but that fresh fibrous prolongations are developed. Certainly in the palm the overgrowth of the fascia (and sometimes of the skin) becomes almost a caricature of the normal arrangement.

<sup>3</sup> Testut and Jacob: *Traité d'Anatomie Topographique*, 1914, II., 827.  
Also Testut: *Traité d'Anatomie Humaine*, 1899, I., 918.

#### THE RISK OF AFTER-TREATMENT BY CONTINUOUS SPLINTING.

The after-treatment usually advocated in a case of Dupuytren's contraction—i.e., that following operation, whether subcutaneous or open division, is so serious and irksome that any method which lessens, or, better still, does away with it, deserves a careful trial. The following is the course of treatment after operation which is at present in vogue. A special metal splint which holds all the joints rigid from wrist down to the terminal joints of the affected fingers "must be worn night and day for the first month"; then a still longer dorsal splint to be worn again night and day, but removed two or three times daily for massage and passive movements to be practised. With this continuous splinting for ten weeks it is obvious that a working man for the whole of this time would be unable to use his hand, and at the end of it would doubtless have lost his employment. This is not all, however. For a further term of at least four months the patient should not give up the use of the splint at night! "When there is much stiffness of the joints a course of treatment by superheated air is useful in getting the part supple." One thing is certain—that if such vigorous and prolonged splinting is carried out the joints are sure to be stiffened more or less, and no hot-air baths will give back suppleness to them.

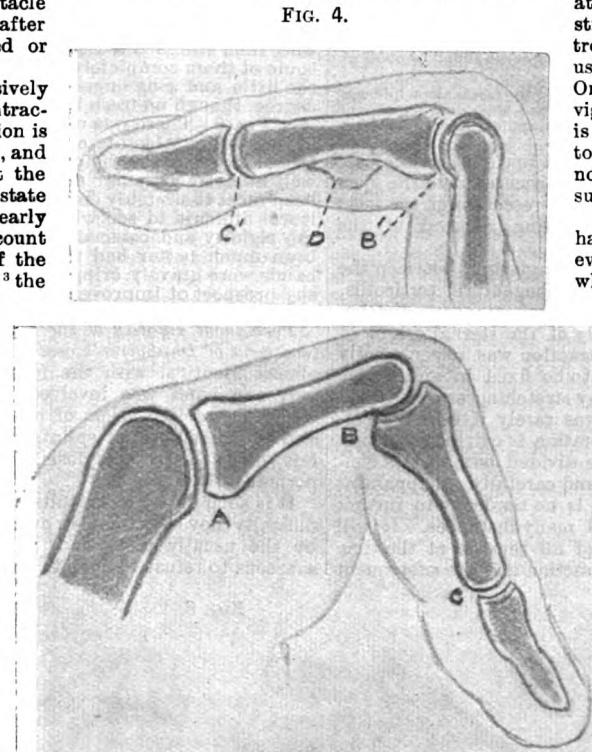
In the account from which I have quoted it is remarked that even if this irksome treatment, which puts out of use the hand for two or three months, is thoroughly carried out "no permanent cure can be looked for, as the contraction recurs within three or four years and a second operation is required." This, it is stated, happens after both the multiple division of the fascia and the V Y method.<sup>4</sup>

Now, it may fairly be asked whether even a man of leisure, one not required to earn his bread by manual labour, would care to undergo such a tedious period of crippling of the hand—for such it comes to. For a working man (and most of us have to use our hands extensively) it is positively disastrous, as I have said it generally means that some other man is found to occupy his berth by the time the patient is

allowed to give up his splint. Nor can a working man be expected to apply the splint every night for a period of six months. It may be said by the advocates of the treatment given above that the whole hand is not confined, only the fingers operated on. But a splint which fixes these and the wrist-joint does put the hand *hors de combat* so far as any working use is concerned. Let any surgeon try wearing such a splint for a week—much less for two months—and he will realise what an infliction and a disability it amounts to. I wish to bring out clearly that by the method now advocated this prolonged splint treatment is done away with; after the operation wounds have healed (a week should suffice) no splint whatever is required, the patient should be encouraged to flex and extend all the joints of all the fingers, and should certainly be back at work within a few weeks of the date of operation.

As to the risk of recurrence, my experience of the method is not long enough to allow me to be dogmatic, but my conviction is that the reliance on splints to stretch the fingers and complete the case is not only fallacious but is apt to

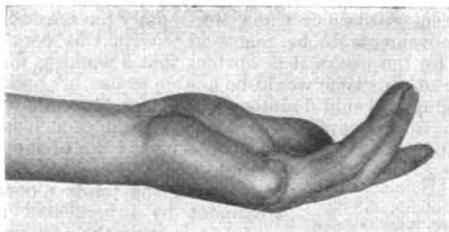
<sup>4</sup> The quotations are from Cheyne and Burghard's *Surgical Treatment*, revised by Messrs. Legg and Edmunds. Similar stringent directions as to the after-treatment will be found in other books.



Radiographs from a typical case of Dupuytren's contraction (involving both little fingers). The explanation of the lettering is in the text.

increase the formation of fibrous tissue in front of the digits, *certainly it risks stiffening of joints and adhesions of tendons to their sheaths*. And once this stiffening has been produced, as I have seen several unfortunate examples, no known treatment will effect any material improvement in it. To sum up the question—loss of suppleness in the fingers due to the surgeon's use of splints may be a greater drawback to the patient than the original contraction. In the after-treatment of a case of Dupuytren's contraction splints

FIG. 5.



Indifferent result after treatment by excision of the fascia alone followed by prolonged splinting. The little finger had been amputated, the others remained stiffened in the position shown.

should be dispensed with after the first few days, if they are used at all. This desirable end can be secured if to the open excision of the fascial bands is added resection of the head of the first phalanx with its resulting removal of the tendency to flexion of the digit.

A fair analogy is afforded by the comparison between the modern and the old treatment of "congenital" torticollis. When the surgeons were content with subcutaneous division of the sterno-mastoid (perhaps only of the sternal origin of the muscle) the tendency to contraction was never wholly removed, the patient's neck had to be fixed in an irksome apparatus, subsequent treatment by stretching exercises had to be employed, and the result was rarely if ever perfect. On the other hand, if the open operation is carried out, if not only both heads of the muscle be divided but also its contracted fascial sheath thoroughly and carefully, all apparatus may be dispensed with and there is no tendency to further contraction. Of this I have had many instances. It will probably prove that the removal of all tension at the time of operation on Dupuytren's contraction and the subsequent avoidance of splint-treatment will have equally lasting effects.

#### SOME RESULTS OF PREVAILING METHODS OF TREATMENT.

It may seem invidious to bring forward examples of failure of treatment by other surgeons, but the view is still held that all cases (mild or severe) of Dupuytren's contraction can be treated successfully by the prevailing methods—either of subcutaneous division or of open excision of the fascial bands. It is my contention that they cannot, and my wish to introduce a new and real improvement. Fig. 5 illustrates the

result in a case operated on by a first-rate surgeon a few years ago. It is clear that after open excision of the palmar fascia he found it impossible to improve the position of the little finger, which was then amputated. The fascia was then dissected away from the third and fourth digits, which were subsequently treated on a splint to further the straightening. From this splinting a good deal of stiffness has resulted and the fingers cannot be

straightened any more than is shown in the figure. They can be bent a little, especially at the metacarpo-phalangeal joints, but the grip of the hand does not include these fingers, it is poor at the best and limited to the thumb and index finger.

The next case illustrates still more forcibly my contention, *arthritis and contraction of nearly all joints of both hands following the treatment of Dupuytren's contraction of the two inner fingers*.

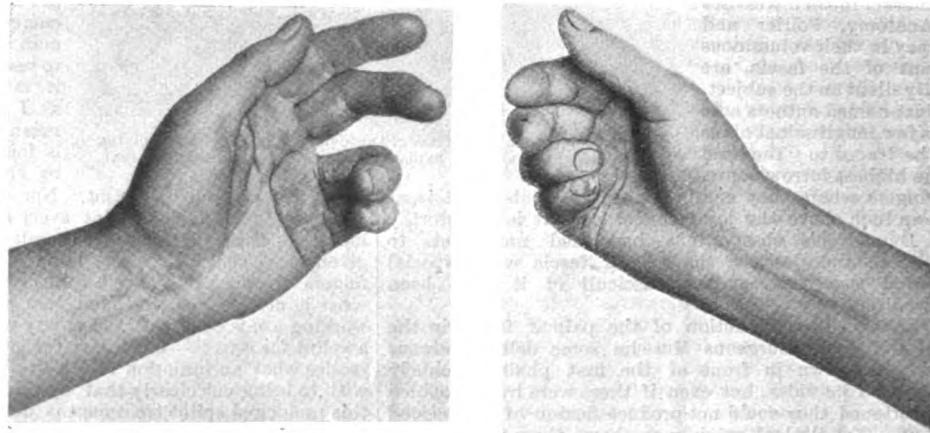
The patient, aged 57, a temperate and healthy man, who showed no evidence of either gout or rheumatic tendencies elsewhere, came under treatment for Dupuytren's contraction of the ring and little fingers of both hands of seven years' duration. The other fingers and thumbs were perfectly supple.

He had two operations performed, first on one hand and then on the other, the contracted bands being dissected out by linear anterior incision. These operations were done by different surgeons and the after-treatment carefully carried out, especially as regards making the patient wear a palmar splint at night-time. This latter procedure he kept up for 18 months, when I saw him for the first time. Both hands were then stiffened as regards all the fingers and the thumbs, some of them completely rigid and contracted. On one hand the little and ring fingers had again bent in to an extreme degree, though no fresh bands of palmar fascia could be felt. (See Fig. 6.) There was undoubtedly evidence of osteo-arthritis of various digital joints, especially of the first interphalangeal ones, and from the rigidity there must have been intra- as well as extra-articular adhesions. Massage, baths, &c., had been most thoroughly employed, though without benefit, and it was difficult to see what more could be done to improve the rigidity and osteo-arthritis. The condition would have been much better had no operation ever been done, as his hands were gravely crippled in all the digits, nor was there any prospect of improvement.

*Permanent rigidity of the whole hand left after operative treatment of Dupuytren's contraction of one finger.* This was almost identical with the former case, though fortunately only one hand was involved. The surgeon had operated on the contracted fascia of one finger; owing to too careful and prolonged use of splints not only were all the fingers left crippled by ankylosis, but the wrist-joint became permanently rigid.

It is such disastrous results as the above, coupled with the difficulty they have found in overcoming the original deformity by the usually advocated methods, that have led some surgeons to refuse to operate on Dupuytren's contraction.

FIG. 6.



Crippling of both hands from multiple osteo-arthritis, &c., due to prolonged splinting after operation (excision of palmar fascia). All the digits are rigid and bent, the deformity has recurred, and both hands are practically useless. (See text.)

#### INCISIONS USED IN DEALING WITH PALMAR FASCIA.

The examples adduced must be enough to bring home the dangers of splint treatment after the operation; a few words remain to be said about the incisions employed in dealing with the palmar fascia. The V Y method in either of its forms, whether the angular reflected flap is made of skin only or of skin and fascia together, is not a good one. It

involves too much scarring of the palm, the prolongation of the fascia to the second phalanx (which we have seen is all-important) cannot be dealt with by this method. In plastic surgery elsewhere (for example, in dealing with ectropion of the eyelids) the V Y method is a failure. I have never known it successful in Dupuytren's contraction.

Again, it is not satisfactory to remove much skin from in front of the bent fingers and to trust to skin-grafts. Mr. W. H. A. Jacobson<sup>5</sup> well pointed out their drawbacks. The wide excision of skin and fascia, followed by transplantation of a flap from the side of the chest (Paul Berger's method)<sup>6</sup> has nothing whatever to recommend it. Among other faults, it fails entirely to deal with the contraction of the first interphalangeal joint. It is strange to find this method recommended above all others in the latest French work.

Seeing that we entirely reject the wide excision of palmar skin as well as the V Y method of a shifting flap, what is the best form of incision to employ? With the proviso that all scars in the palm may prove a slight drawback and should be made as short as is consistent with the thorough dissection of the contracted bands, further that it is useless to lay down exact lines of incision for differing cases, the following points are worthy of consideration.

1. The main incision must be linear and vertical, over or closely parallel to the ridges of palmar fascia. Small transverse incisions at the front of the web may be needed, and any prolongation of the fascia in front of the first phalanx must be followed down and dissected out.

2. In the case of the middle or ring finger it is impossible to avoid placing the incision towards the mid-palm. In the case of the little finger alone the incision may be made rather to the ulnar side of the hand, where the skin is more supple and less subject to pressure.

3. In closing the wounds the finest silkworm-gut (ophthalmic) should be used. It is rarely necessary to leave any raw area to granulate up, especially if the head of the first phalanx has been excised and tension in the front of the finger thus removed.

Should a small plastic operation be required a tongue-shaped flap with its base upwards might be taken from the side of the digit concerned and shifted over so as to lie transversely. I have repeatedly used this method in cases of ectropion with good results, but in Dupuytren's contraction it can be rarely necessary. As such a flap contains the whole thickness of the skin and its blood-supply, and is fixed in place by two or three fine sutures, it is much better than the epithelial grafts advocated in the text-books.

#### ON DUPUYTREN'S LIFE AND WORKS.

Guillaume Dupuytren, the son of a poor *avocat* (or barrister-solicitor) in the small town of Pierre-Buffière, was born on Oct. 5th, 1777. He died in Paris on Feb. 5th, 1835, at the age of 57. Dupuytren was therefore a contemporary of the two great warriors Napoleon and Wellington, being eight years junior to them, and his birth almost coincided with that of the three immortal masters of Art—Beethoven, Turner, and Hokusaï. Sir Astley Cooper was his contemporary and friend, but was his senior by nine years.

There are many biographical reviews of Dupuytren in French, but nothing like a complete account of his life or works. In English there is hardly anything of value, though the New Sydenham Society gave us his "Leçons Orales" in an admirable translation. Of the French notices of Dupuytren several were written in a very critical or hostile spirit, and even as to the facts and dates of his life contradictory accounts are frequently met with.

I hope later to publish more fully a biography of the man who was certainly the most famous, if not the greatest, of all French surgeons; on the present occasion a brief notice will have to suffice.

In 1789, the first year of the French Revolution, a certain Captain Keffer, when passing through Pierre-Buffière with his regiment, was so taken with the young Dupuytren that he offered to have him educated in Paris, an offer gladly accepted by the parents. The next four years were spent in the Collège de la Marche, of which M. Keffer, the captain's brother, was the principal. Dupuytren's studies were brought to an abrupt end at the age of 16 by the closure of the Paris schools, and in 1793 he journeyed home on foot—200 miles. A few months later, his father having decided in favour of the profession of medicine, Dupuytren returned to Paris.

His student days were passed under the greatest difficulties owing to extreme poverty. His relations would not or could not help him, and in a state of complete destitution he would have gone under but for the succour of an illiterate water-carrier from Auvergne, named Jean Sebastian. This poor but saint-like man provided lodging and food for Dupuytren (who had for many weeks subsisted on bread alone), found money for necessary books and fees, and was rewarded by Dupuytren's appointment (at the age of 18) to be Prosector of Anatomy at the École de Santé. This post was paid, however poorly, and by teaching anatomy and surgery (!) the young student eked out a living. Unfortunately his benefactor died, in Dupuytren's arms, at the very time when the latter was about to pay back some of the priceless help he had received.

He had taken his degree as Doctor of Surgery before he was 20, and five years later we find him "chef des travaux anatomiques," and, what was of far more importance, second surgeon (a new appointment) at the Hôtel Dieu. Both appointments were given after public competition (Concours). M. Pelletan was the chief surgeon at the Hôtel Dieu, and it must be owned that Dupuytren proved an unpleasant colleague. It is evident from his writings that he had a low opinion of Pelletan's surgical ability, if not a strong personal animosity towards him, and in 1808 he succeeded in compelling him to resign. Thus, at the age of 30, Dupuytren stepped into the post of surgeon to the Hôtel Dieu and for the next 20 years he had sole control of the surgical wards in the only large hospital in Paris. In this unique position, with the care of some 500 beds, he accomplished an amount of strenuous work which can rarely, if ever, have been surpassed. He did everything—operated on all cases alike in general surgery, ophthalmic work, gynaecology, and other special branches. He lectured to classes which sometimes numbered 500, he conducted an out-patient clinic, made surgical post-mortems, visited the wards, and performed the dressings himself. His hospital visit began every day at 5 A.M., summer and winter he rarely missed a day; he left the Hôtel Dieu only at 1 P.M., and habitually made an evening round of the wards. With all this prodigious hospital work he carried on a private practice which enabled him to save the great fortune of £150,000. His repute as a consultant, an operator, and a teacher was European; his only rival in these respects was Sir Astley Cooper.

#### *Some Events in Dupuytren's Life.*

Dupuytren must have witnessed the stirring events of the Revolution in Paris. Marat lived and was assassinated by Charlotte Corday in the Rue de l'École de Médecine; Marat's club—the scene of his and Danton's frenzied orations—stood at the end of this street, and the hall itself became ultimately the Dupuytren Museum. This is the only part of the old convent of the Cordeliers which has survived to the present time.

When the allied troops were taking Paris in 1814, Dupuytren showed personal bravery at the head of an impromptu ambulance party which he organised from his internes of the Hôtel Dieu and led out to La Villette.

During the occupation of Paris Dupuytren, then and until his death residing in a house on the right bank of the Seine opposite to the Louvre, had quartered on him a young Russian ensign named Kazakov, who has left an account of his host which is full of interest. This Russian officer survived until 1883, his narrative only came to light a few years ago, and I discovered it by accident. Kazakov describes Dupuytren as having been a kindly but tyrannical host, living in simple style (although he then enjoyed a large practice and income) with his wife and only daughter. It may be noted that Madame Dupuytren seems to have left him later—there was some scandal. It was his ambition to make his daughter a great heiress, and with the exception of a moderate legacy to found a Chair of Pathological Anatomy, all Dupuytren's wealth passed at his death to her.

Alike under Napoleon, Louis XVIII., Charles X., and Louis Philippe, Dupuytren's star never failed him. His being a freethinker in religion did not hinder his Court appointment as surgeon to bigoted Catholic monarchs. When the King's brother, the Duc de Berri, was assassinated at the Opera, Dupuytren was called to attend him; he subsequently published an often-quoted account of the death scene. This was written partly to defend himself from hostile critics and professional enemies, who never failed Dupuytren throughout his whole career. The Duc de Berri

<sup>5</sup> Jacobson's Operations of Surgery, 1907 edition, i., 30.  
<sup>6</sup> Paul Berger, Acad. de Méd., April 20th, 1892.

had been stabbed in the chest, and for some reason Dupuytren thought it right to enlarge the wound. The dramatic scene at the Opera, when the Duke's wife met and acknowledged for the first time two illegitimate daughters of her husband, has been pictured and engraved. Amongst the crowd grouped round the dying Prince Dupuytren's portrait may be recognised.

This is the only one of all the State episodes in Dupuytren's experience of which he has left a record. He was, in fact, through life absorbed in his professional work; he had no other interests, no politics, no religion, and no friend except his daughter. A stern, melancholy, ambitious, and bitter man, it is difficult to idealise Dupuytren except as a martyr to his work. When urged to have assistance at his hospital, or to take some holiday or rest, his reply would be, "There is no rest but the grave." An attack of partial hemiplegia during the delivery of a clinical lecture warned him of the inevitable breakdown which must follow such perpetual toil as his; two assistant surgeons were practically forced upon him. A journey to Italy for the benefit of his health, the first time Dupuytren ever left France, was of no avail. He returned to Paris and resumed his arduous work. A chill contracted during his hospital work resulted in pleuritic effusion, of which he died.

It is a mistake to assume that the Dupuytren Museum was founded or endowed by him: it owes nothing but its name and a few specimens to him. In this respect our Hunterian Museum, which was in being long before Paris had any adequate pathological collection, is a marked contrast, as John Hunter gave everything to it. In size and importance our museum far surpasses its French rival: there is really no comparison to be made between them.

#### *Dupuytren's Surgical Work.*

Dupuytren's surgical teaching and experience are contained in the "Leçons Orales" and the second edition of Sabatier's "Operative Surgery." In both cases his pupils, aided and directed by Dupuytren, reported his lectures and arranged his observations. The "Leçons Orales" deals with a great number of subjects in a somewhat disjointed manner, the other work is more systematic. Both contain copious narratives of cases and pathological records spread over several thousands of pages.

It is strange that Dupuytren neglected the aid of all illustrations, whilst Sir Astley Cooper employed them so freely and so well that it is still a pleasure to consult his works. Had Dupuytren followed his rival's example his works would not have fallen into such oblivion. Dupuytren lectured to immense audiences, but there is little reason to consider him an eloquent orator, and his writings lack the attraction and the style of Sir James Paget or Sir Frederick Treves. In spite of his unique position, in sole control during a generation of the one great surgical clinic in Paris, it can hardly be claimed for Dupuytren that he made great discoveries in surgery. Nevertheless, we owe to him many valuable observations and real advances in our science. He first demonstrated the nature of yellow elastic and erectile tissues, and he proved on animals that excision of the spleen could be safely carried out.

He showed that iliac abscess on the right side was frequently due to perforation of the vermiciform appendix; that chronic enlargement of the testis was often caused by syphilis and was curable by mercury given internally. Dupuytren's pill for syphilis, containing bichloride of mercury, is still advised in France as an addition to the treatment by galyl. He wrote copiously on fractures of the long bones, and greatly improved their treatment, especially those of the femoral neck and lower end of the fibula. His treatment of artificial anus survived until recent years. He was the first surgeon to excise a carcinomatous cervix uteri and the first to describe congenital dislocation of the hip. Dupuytren was specially interested in the treatment of both lacrymal fistula and cataract; the former he improved, but he adopted the operation of "couching" with his special needle as the routine operation for cataract. In this he was certainly wrong, and sinned against the light of his time in more than one sense.

With regard to the surgery of the blood-vessels Dupuytren records many interesting and bold operations, following in part those of Abernethy and Cooper. He devised a whole series of surgical instruments, and did invaluable service in reforming the treatment of urethral stricture by introducing the gradual dilatation by flexible bougies.

Of all his work in surgery, perhaps the most original was that on the contraction of the palmar fascia, which has immortalised his name. Whether Sir Astley Cooper first suggested the right explanation of this condition (as asserted by one French writer) or not is quite immaterial. But it may remind us of the fact that Dupuytren, though he never visited England, was a friend of Cooper's, and that his writings are full of references to his works and those of other English surgeons. He had a special admiration for Sir William Lawrence's writings, and to English visitors in Paris he opened his mind more fully than to any others.

#### TWO POINTS CONCERNING FRENCH HOSPITALS.

The Duke of Wellington repeatedly affirmed (about the year 1840) in words that deserve to be recalled: "It is an old and very strong conviction of mine that in matters of peace we can do nothing except in cooperation with France." In medicine and surgery the two nations have learnt much from each other; a closer understanding must result in further gain. I will allude to two points only brought out by the study of Dupuytren's life and time.

The first is the system of election to hospital appointments. From the period of the Revolution to the present one the French have elected their hospital surgeons by public competitive examination—the Concours. This examination is, exactly like that for the Final Fellowship, held in public. In England until quite recently the selection at some hospitals was made through canvassing the votes of a heterogeneous mass of governors! It would need the caustic pen of a Charles Dickens to describe the iniquity, the expense, the absurdity of such a system. Fortunately it is now extinct, or very nearly so. The present method of selection varies somewhat at different hospitals. It has many defects, but the best candidates are elected by it in a moderate proportion of cases. Could we improve matters by adopting the Concours? Probably we should, but the change is not likely to be made.

The other point is of far greater importance. In France for over a hundred years the hospitals have derived much of their income from a tax (3 to 10 per cent.) on the gross receipts of all theatres, music-halls, and other places of entertainment. The year before the war, in Paris the income from this source was no less than £250,000. In London a similar tax would produce an annual revenue of at least £500,000. How long will it take us to follow the admirable example set in this respect by the French? The flow of private benevolence need not be checked by it, nor endowments, nor help given by Government to Universities or medical colleges. We want the money badly. The hospitals, apart from their maintenance, need more convalescent homes; they ought to be enabled to pay their nursing staffs in a more adequate manner. In Paris all who work in the hospitals or who teach medical students, from the internes to the professors, receive some salary; many of the teachers are well paid. In London medical education, research work, and clinical teaching are alike hampered and starved through want of funds and pecuniary encouragement. The teachers of science, such as those of anatomy, physiology, bacteriology, &c., may perhaps earn a living, but never a sufficient recompense. The clinical teachers, who train our students in the most important part of their career, with rare exceptions receive no pay at all. Again, in Paris every year many valuable money prizes are given for original research and essays in medicine and surgery. In London, the richest capital in the world, there is only one such reward annually given for original work on a surgical subject, the Jacksonian prize of the College of Surgeons. Its net value is £13 or £14. The drawings alone which accompany the essay may well have cost the successful competitor £100.

Surely we have much yet to learn from France.

#### "CONCLUSION."

In the first part of this lecture I trust that a real addition to our knowledge of the pathology and treatment of Dupuytren's contraction has been established. To devise and introduce some improvement, to render more easy and effectual our treatment of a disabling deformity, is in itself a source of personal pleasure. That pleasure is much enhanced by the knowledge that a tribute has at the same time been paid from this theatre to the memory of the distinguished French surgeon whose life and works we have been considering, and to the great nation with whom we are henceforth indissolubly allied.

## ABSTRACT OF

## An Address

ON THE

HUNTERIAN TRADITION IN CARDIAC  
RESEARCH.*Being the Eighty-ninth Annual Oration delivered before the  
Hunterian Society on Feb. 14th, 1917.*By W. LANGDON BROWN, M.A., M.D.CANTAB.,  
F.R.C.P. LOND.,ASSISTANT PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL AND  
PHYSICIAN TO THE METROPOLITAN HOSPITAL;  
CAPTAIN, R.A.M.C. (T.F.).

[AFTER giving a sketch of John Hunter's personal relations with his colleagues at St. Bartholomew's Hospital, the lecturer continued:—]

*Hunter's Conception of the Heart and its Modern  
Development.*

I must turn now from the association of John Hunter with some of the eminent men of the past to consider the influence of his methods in the present and their promise for the future. And my reasons for selecting cardiac research from which to illustrate this are twofold. It is a branch of medicine which in the last few years has shown active progress, and that progress has been achieved by exact observation and the comparative method. Everyone realises what an essential part experiment played in Hunter's work, but less has been said of the liberal use he made of comparative anatomy and physiology. Yet the arrangement of his museum shows that this was really the dominant idea with him. And comparative anatomy and physiology lie at the root of the advances in cardiac research.

I regard as Hunter's two great contributions to cardiology the classification of animals based on the arrangement of the chambers of the heart and the generalisation that the situation of the heart depends on the situation of the organs of respiration, which it always follows. The latter point is of great value, but not germane to our present topic. It is admirably illustrated by the descent of the heart from the neck in the gill-breathing embryo into the thorax of the lung-breathing adult, a descent which explains the curious course of the recurrent laryngeal nerves. As to his classification of animals according to the arrangement of the heart, Sir Richard Owen considered it superior to that of Linnaeus, and spoke thus of Hunter as a comparative anatomist, "He merits a higher and altogether different station than has been awarded him by Cuvier. It appears to me that he marks a new epoch in its history." This is praise indeed. Hunter's conception of the heart was that of a tube which, as we ascend the animal scale, becomes increasingly complex in the arrangement of its chambers, the insects having but one (monocilia), the fishes two (dicoilia), the amphibia three (tricilia), and the birds and mammals four (tetracilia).

It is now more than 25 years since at Cambridge I came under the influence and teaching of Gaskell, surely one of the most original minds that ever adorned British physiology. On the experimental and comparative side his work on the heart and sympathetic nervous system laid the foundation for all our recent advances. And while he was working in the laboratory, a busy practitioner in a Northern town was carefully observing patients and recording year after year the vagaries of their pulses and the reaction of their hearts to the stress and strain of life. I mean, of course, Sir James Mackenzie. Starting from two entirely different standpoints, the observations of these two men converged at last and led to a reconstruction of our ideas of cardiac pathology, which is full of promise for the future. Without recounting the steps by which the knowledge was obtained, I may summarise the development of the Hunterian conception of the heart as follows.

If we look at the vascular area of a chick early on the second day of incubation we see the heart is then a simple tube, slightly bent on itself. Pulsations are passing slowly from the venous to the arterial end, and this rhythm begins long before there is any differentiation into muscular and nervous elements. Here is the primitive cardiac tube in actual existence, and not as a mere concept. By the end of

that day the heart has become S-shaped, the form found in the fish throughout life, and rudiments of the auricular appendix have appeared. The next day the curvature of the tube has increased, and the demarcation of its several cavities can be made out. In fact, the embryo rapidly repeats events in the evolution of the heart which we believe originally occupied many ages. In the process of evolution the primitive tissue became reduced in amount but more concentrated in position, while more highly differentiated muscle developed in the lateral expansions of the tube to increase the content of the heart. This muscle was specialised for rapidity of contraction. Incidentally I may point out that it is a necessary consequence of a lateral expansion of a tube that it should contract more rapidly than the central portions if there is to be a coördinated wave at all.

Gaskell concluded that the heart-beat normally began at the sinus venosus in a heart such as the tortoise's because the muscle here was of a more embryonic character, while the ventricular muscle was more highly differentiated. But by warming the ventricular end and cooling the sinus he was able to produce a series of reversed beats. He showed that the normal wave of contraction would pass by any channel as long as a sufficiently wide bridge of muscle were left for it; the contraction was a property of the cardiac muscle and not of any ganglion cells. If the bridge was made too narrow by cutting too deeply into the muscles every wave could not pass, though perhaps alternate ones would; he had produced a partial heart-block. An adequate strand of conducting tissue is, therefore, essential to the due propagation of the wave of contraction along the cardiac tube. Such a strand was found to exist in the mammalian heart by Stanley Kent in 1893. In our characteristic British way we ignored this discovery until it was rediscovered by a German, His; then we accepted it, and the strand is now known as the auriculo-ventricular bundle. It is composed of fine, pale, branching fibres, which in some respects resemble embryonic muscle fibres. But if such fibres are the conducting strand along which the wave passes, we should expect to find similar fibres at the junction of the great veins with the heart, since this is where the wave starts, and Keith and Flack found them there, in close connexion with the vagus and sympathetic nerves. They called this the sino-auricular node. Here the dominating rhythm of the heart normally arises, and here it may be readily modified by extrinsic nerves. Between the sino-auricular node and the auriculo-ventricular bundle there appears to be none of the primitive cardiac tube left. This extreme reduction of the primitive tissue is typical of the mammalian heart, and with this reduction the heart has become less automatic in its action and more in subjection to the central nervous system.

Like the chick's heart on the second day, the remains of the primitive cardiac tube appear to be endowed with the properties of both muscle and nerve. In some lower types, such as *Limulus*, the king-crab, the nervous and muscular elements are anatomically separate. In the mammal we can effect this separation by chloral, which poisons the nervous elements, so that the heart muscle will now behave like ordinary striped muscle.

Just as Gaskell was able to make the tortoise's heart start beating at an abnormal spot, so we find that extra beats may start in the human heart from an abnormal position. Just as he was able to produce heart-block by interference with the conducting bridge, so we may see heart-block produced in man by disease of the auriculo-ventricular bundle. The beats may also be initiated by the irritation of extrinsic nerves, acting on the sino-auricular node. It is the special value of Mackenzie's work that it has enabled us to classify the principal forms of irregular heart met with clinically in terms of disturbance of the primitive cardiac tube.

I propose now briefly to consider some of the recent additions to our knowledge under the three heads of the irregular heart, the dilated heart, and the irritable heart.

*The Irregular Heart.*

Five types of irregularity are now recognised of very different significance. It is important to realise that they are not all of serious portent. I shall place them in the order of increasing gravity.

1. *Sinus irregularity.*—This Mackenzie calls the youthful type of irregularity, and it is compatible with a perfectly healthy heart. The rhythm is initiated at the normal place, at the sino-auricular "pacemaker," but not at the normal

time. One the wave of contraction is started, it is propagated quite normally. The duration of systole remains constant, but the diastolic intervals vary. As the pulse quickens the diastolic intervals are encroached upon, so that this type of irregularity disappears during fever or exertion. It is due to vagal irritation, as is shown by the way it may be induced by swallowing or by hurried respirations—two acts which stimulate the sensory branches of the vagus. Sinus irregularity can be recognised by the fact that though the pulse-rate is varying, usually with respiration, the beats are equal in strength, while on auscultation the interval between the first and second sounds is constant. It does not cause any inconvenience, and its recognition is important simply that undue significance may not be attached to it.

**2. Extrasystoles.**—When a stimulus is initiated at some other part of the heart than the sino-auricular node a premature contraction will occur, and as the heart has not had time to accumulate enough contractile material, this beat will be smaller than normal, and, for a similar reason, it will be followed by a longer pause. This disturbance of rhythm constitutes the extrasystole, and usually involves the ventricle alone, though it may occasionally implicate the auricle. The patient is conscious of the long pause and of the thud which follows it, and it can be detected without instrumental aid by the two beats in rapid succession followed by the pause. The electrocardiogram will show that the extra beat has started from some situation other than the primitive cardiac tube, and for that reason it has been called an "ectopic beat." Mackenzie calls it the adult type of irregularity, and says that hardly anyone over 60 fails to show it. It is often induced by gastric disturbances and by drugs. In itself it does not give any cause for anxiety. Attention to the digestion, and moderation in the use of tea and tobacco will diminish its occurrence, or, at any rate, diminish the patient's consciousness of it, which is all that is necessary. Paroxysmal tachycardia is apparently due to auricular extrasystoles. Transitional between this and the next type of irregularity to be described is "auricular flutter," in which the auricle may maintain a rate of more than 300 a minute. But too little is known of this rare type to make its further discussion profitable here.

**3. Auricular fibrillation.**—The explanation of this type of irregularity we owe to Thomas Lewis. It is seen in the later stages of mitral stenosis. The typical crescendo presystolic murmur may suddenly vanish and be replaced by a diastolic rumble, diminuendo in character. At the same time the pulse will become highly irregular, and usually very frequent. The veins in the neck become distended, and the patient becomes extremely distressed with shortness of breath and cyanosis. The electrocardiogram shows that the proper auricular contraction is replaced by incessant fibrillary tremors. Mitral stenosis leads to more and more strain upon the left auricle because of the difficulty it offers to its emptying its load into the left ventricle. For a time this is met by hypertrophy of the auricle, but a stage is reached when the auricle becomes so overloaded that it can no longer contract properly and only fibrillary tremors can take place. The presystolic murmur must vanish since it is produced by auricular contraction; the diastolic murmur is due to passive pouring of blood into the ventricle during diastole. As this flow of blood will diminish as the ventricle fills, the diastolic rumble produced will be diminuendo in character. The ventricular output suffers in two ways. Firstly, the auriculo-ventricular bundle is stimulated in a most irregular manner by the fibrillations of the auricle, and its contractions will be rapid because of the number of stimuli reaching it. Secondly, the output of the ventricle will be interfered with because the ventricle now lacks one of the most potent factors in the production of its systole—namely, the sudden squirting of blood into it by the short, sharp auricular contraction. As we shall see later, this stretching of the ventricular muscle by driving blood from the auricle into the ventricle is a powerful stimulus to adequate ventricular contraction. Thus the ventricle is now urged to rapid and ineffective contractions, placing the heart at a serious mechanical disadvantage, which sooner or later leads to its breakdown. It is, then, not the primitive cardiac tube that is at fault, but the thin sheet of more differentiated muscle which lies between the two remaining portions of this tube. This is the form of irregularity for which digitalis is particularly appropriate, for not only has

it a tonic action on the distended auricular muscle, but it also lowers the conductivity of the auriculo-ventricular bundle, enabling it to ignore a large number of the ineffective stimuli reaching it from the fibrillating auricle. It is clear that auricular fibrillation is a more serious form of irregularity than those we have previously considered. It connotes a structural alteration in the heart, which plays an important part in its ultimate breakdown.

**4. Heart-block.**—This condition has been known since the middle of last century as Stokes-Adams disease, but its significance and the method of its production have only been appreciated during the last decade. The characteristic features are the infrequent ventricular contractions, while the auricular contractions remain normal, and the attacks of vertigo, syncope, and epileptiform convulsions. Various anatomical lesions have been found, but the factor common to them all is damage to the auriculo-ventricular bundle, so that the passage of the wave from auricle to ventricle is interfered with. It is the clinical equivalent of the heart-block produced by Gaskell in the tortoise's heart by cutting the auricular muscle until the bridge is too narrow for all the waves starting in the auricle to be propagated into the ventricle. Perhaps two out of three waves may pass or only alternate ones. The block may become complete, so that the ventricle is dependent on its own rhythmical power for any contractions at all. Sometimes the block is caused by the toxins of disease such as rheumatism, sometimes by drugs such as digitalis, where conductivity is impaired. But more usually there is a fibrosis of the bundle or a gumma pressing on it. So that the condition is serious and tends to get progressively worse in spite of treatment. It is therefore a serious form of irregularity, since it is due to interference with the primitive cardiac tube at its narrowest, and therefore its most vulnerable, point. The syncope and convulsions are the direct result of the cerebral anaemia caused by the slow ventricular beats. When the pulse-rate falls below 30 in the minute there can hardly be an adequate supply of blood reaching the brain.

**5. The alternating pulse.**—Here the irregularity is not one of time but of force. There is a regular succession of small and large beats. It is due to a failure of contractility, and the probable explanation is that with the smaller beats not all the fibres contract. This means that some of the fibres are so exhausted that they only beat half as frequently as the rest of the heart. The condition usually occurs in elderly people with high pressure, and it may only be brought out by exertion. There must be a great impairment of the reserve force of the heart before it comes on, and according to Davenport Windle the importance of recognising this altered rhythm is that it is a danger signal which appears before the symptoms of heart failure are manifest. Either dropsy or angina is imminent, and in none of Windle's cases was life prolonged more than 17 months after alternation of the pulse had been observed.

In the briefest possible manner I have described the cardinal features of the recognised types of irregularity, some of which may coexist, producing most confusing conditions. It is sufficient for my purpose if I have made clear the relations of these irregularities to the primitive cardiac tube. In sinus irregularity the tube is healthy, but is stimulated irregularly by the vagus; in extrasystoles there is some irritable focus outside the remains of the tube; in auricular fibrillation the more differentiated muscle between the two portions of the primitive tube fails to act properly; in heart-block there is failure of conductivity through the narrowest part of the tube, while in the alternating pulse there is failure of contractility in the specialised lateral expansions of the tube. Stated in this order we have a series passing from a harmless irregularity to one which is inconsistent with life for much more than a year.

#### *The Dilated Heart.*

Recent work has thrown important light on the nature of cardiac dilatation. For some years we have known that the heart is very tolerant of interference with the systolic output, while very intolerant of interference with its diastolic filling. Thus, if a ligature be placed around the aorta of an animal and very slowly tightened, the lumen may be reduced to one-third of its normal calibre before the output of blood from the heart is diminished. On the other hand, if an aneurysm bursts into the pericardial sac a man may die suddenly although the sac contains only 10-12 oz. of blood.

No one dies from so small a loss of blood ; it is the interference with the diastolic filling that stops the heart. Similarly when people are crushed to death in a crowd they die from syncope and not from asphyxia. The fixation of the chest interferes with the return of the blood from the great veins, diastolic filling is interfered with and the heart stops. In 1908 I suggested that this interference was so deadly because it deprived the heart walls of that tension which is so powerful a stimulus to contraction. The recent work has confirmed this suggestion and amplified it in a striking manner.

We owe to A. V. Hill the conclusive demonstration that the energy developed by a muscle is directly proportional to its previous stretching. Starling and his school applied this generalisation to cardiac muscle, and showed that if the heart were given more work to do, for instance, by a rise of peripheral resistance, it would dilate until the diastolic stretching thus produced developed sufficient energy to enable the heart to do the increased work. So that dilatation in its inception is a compensatory measure. This accounts for that transitory dilatation which is often observed but has hitherto been unexplained. I have seen a patient's apex beat move an inch outwards in the course of a minute or so, and then return to its normal position ; this has usually been in a weakly person soon after undertaking some slight exertion. The enfeebled heart required this extra stretching to develop sufficient energy. But if the maximum elongation that can be obtained is not enough to develop the required energy the heart must remain dilated. This is only likely to occur if the muscular nutrition is impaired. If the myocardium is diseased its contractility is diminished and the temporary physiological dilatation passes into a permanent pathological dilatation. Now we can understand why interference with the diastolic filling is so deadly ; it prevents that stretching of the muscle which is so essential to the development of its energy. A new light is thrown on the mechanism of the filling of the auricles, the filling and the emptying of the ventricles. If the auricle is not contracting with sufficient energy a rise of venous pressure will enable the blood entering the heart to stretch the auricle more thoroughly and thus to stimulate it to increased contraction. We speak of this rise of venous pressure as a "back pressure," as if it were a consequence of failing heart, but we have not realised that it is developed as an attempt to combat that failure. This rise of venous pressure has its drawbacks. Venous pressure tells directly on the thin-walled capillaries, unlike arterial pressure, which is shut off from the capillaries by the constriction of the arterioles. A rise of pressure in these thin-walled capillaries allows transudation of fluid to occur into the surrounding tissues ; hence dropsy, albuminuria, and congested liver. Saline aperients help to restore compensation by depleting these overloaded capillaries while permitting the rise of venous pressure to exert its stimulating effect on the heart.

In the same way the auricular contraction is made as short as possible. For seven-eighths of the cardiac cycle the auricle is resting, or rather it is being stretched by the blood pouring into it from the veins. This enables it, in spite of the relative thinness of its musculature, to develop enough energy to squirt blood forcibly during the remaining one-eighth of the cycle into the ventricle. This sudden distension of the ventricle acts as a powerful stimulus, and what the loss of this stimulus means when fibrillation of the auricles occurs is seen in the consequent profound disturbance of the ventricular output.

We can also understand now why the blood pressure often rises when the heart is failing. It is sometimes a surprise to find a blood pressure of 200 mm. or even more when the heart is beating feebly and fast. It has often been assumed that the heart is failing behind the high pressure, but really the pressure is rising because the heart is failing. If the output of the ventricle is diminished the arterioles constrict in order to diminish the size of the vascular bed to be filled. But this in itself would only raise a falling blood pressure back to normal. The subsequent rise is in order to stretch the ventricular muscle, and thus to stimulate it to renewed effort. When a failing heart is accompanied by a low pressure, as it is in acute toxæmic conditions, it is because the vaso-motor system also is poisoned and cannot respond to the demands of the medulla. Death is then imminent.

This rise of arterial pressure has another advantage, as I pointed out some years ago, and as has now been experi-

mentally confirmed by Starling. The coronary arteries have no vaso-constrictor nerves. A rise of arterial pressure, therefore, drives more blood into the coronary arteries, and thereby increases the blood-supply to the heart muscle at the moment when more work is demanded of it.

The effect of a cardiac tonic is twofold ; by slowing the heart it allows of its proper filling, and therefore of its adequate stretching, but it also enables the muscle to contract with less initial stretching, with the attendant risks of over-stretching. This avoids the need of a rise of venous pressure with its accompanying drawbacks. One is impressed afresh by this new work with the extraordinary adaptation of the heart to the mechanical problems it has to face.

#### *The Irritable Heart.*

The final topic with which I wish to deal, and that quite briefly, is the irritable heart of soldiers, with which we have become so familiar of late.

A soldier may begin to find himself short of breath on any exertion, suffering from precordial pain and palpitations. He is easily exhausted and has to fall out on a march. If he lies down he soon feels all right, except perhaps for some indigestion, even when kept at rest in bed. On getting up again he feels dizzy and faint. He looks depressed ; his face is pinched and drawn. Vasomotor instability is proclaimed by the cold and rather blue extremities, which may quickly become cold and clammy. There may be tremors of the hands. He is labelled D.A.H. (disordered action of the heart) and consequently takes a gloomy view of his future, which in itself militates against his recovery. Examination of the heart does not reveal anything definite ; there is no enlargement, but there may be various murmurs, which tend to pass away with rest. Many of the murmurs I should formerly have unhesitatingly pronounced to be organic, but the way in which they pass away and reappear shows that they cannot be so. The pulse is always too fast in the upright position and may remain too rapid even when in bed. But there are no signs of failing compensation.

The condition is an intractable one. The patient accepts the diagnosis as evidence that he has definite heart disease. Parkinson found that of 39 cases he sent home only 4 had returned to duty feeling quite well, at the end of an average period of seven months (minimum 4, maximum 14 months) ; 22 of them were no better or were still in hospital. And this accords with the experience of most of us.

This form of the disease has been commoner than the definite attacks of paroxysmal tachycardia, which had often been noticed in young recruits. The condition has long been recognised, but cannot be said to have been fully explained even yet. It is prevalent among the enemy. Goldscheider says : "The war has brought into unflattering prominence the ignorance of the medical profession of a group of symptoms with which a very large proportion of the German Army have been invalidated." In 1864 it was referred to the type of accoutrements worn, in 1876 to the "setting-up drill." Both of these have been abandoned, but the disease remains. Three other explanations have been offered more recently : that it is due to a poisoned heart, that it is purely neurasthenic, and that it is due to some perversion of the internal secretions.

Sir James Mackenzie states that in his opinion 90 per cent. are not primarily heart cases, and that the principles of treatment are widely different from those for heart failure. He considers they are generally due to the effect of strain during the time that the heart is poisoned by some intercurrent infection. If this is so, it is curious that the signs and symptoms do not approximate to those of myocardial failure, which may be induced under similar conditions. But there is support to the theory in the frequency with which gastro-intestinal disturbances have preceded the heart symptoms. Da Costa noticed in the American Civil War that diarrhoea was a common precursor. This accords with my experience in the South African War. In this war we have had large numbers returned from Salonica who began to suffer with their hearts in this way after malaria, and various other infections have also been held responsible. I have not noticed a liability to irritable heart after epidemic nephritis, but this is probably due to the prolonged rest in hospital which that disease entails. Earlier in the war instances occurred where soldiers had deliberately upset their hearts by eating cordite, but this has apparently been checked by disciplinary measures.

Tobacco may be a factor in some cases, but non-smokers have suffered, and I have seen its prohibition fail to produce any improvement.

The second view is that the condition is a purely nervous one. Some years ago I was accustomed to point out, chiefly as the result of my experience in the South African War, that whereas traumatic neurasthenia was common in civil life—for instance, after a railway accident—it was comparatively rare in war. No one would venture to make such a statement to-day, for our experience in this war has singularly falsified it. Prolonged strain and high explosives have altered all that, and "shell shock" has passed into ordinary parlance. Many such cases show cardiac symptoms exactly like those of soldier's heart.

The strain of warfare may cause a breakdown in the weakest spot, which may be the vascular system. Rudolf believes that the majority of the patients have shown vaso-motor instability for years. That the sufferers from soldier's heart are neurasthenic I am convinced, but I am not convinced that the cardiac condition is due to neurasthenia. I have known some of these men before the war, and they certainly were not neurasthenic then. To refer it all to the nervous system without further explanation may be a mere cloak for ignorance, and does not tend to the satisfactory treatment of men who may be suffering from a physical incapacity, the intangible nature of which in itself increases the liability to neurasthenia.

The nervous theory is not incompatible with the internal secretory theory. Both the suprarenals and the thyroid have been held responsible. Adrenalin is one of the defensive mechanisms of the body. It is the hormone to the sympathetic nervous system, and many different stimuli lead to hurrying up of this secretion into the circulation to assist in rapid sympathetic response. But with frequent repetition of the stimuli exhaustion of the secretion may be induced with consequent loss of tone of the whole sympathetic nervous system. Previous infective conditions would hasten the exhaustion, for we know, indeed, that some diseases, such as diphtheria, have a marked effect in diminishing the amount of chromaffin material in the suprarenals.

Other observers consider that the symptoms are due to hyperthyroidism. In support of this they point to the influence of shock and fright in inducing Graves's disease, and to the existence of tremors and tachycardia with other cardiac symptoms both in Graves's disease and in the condition I am discussing. Moreover, they claim that the thyroid is often enlarged in "soldier's heart," as, indeed, I have sometimes found to be the case, and that treatment of this gland by X rays markedly benefits the patient, of which I am not so confident. Still, the theory is one that demands consideration.

In most cases one can find no definite enlargement of the thyroid and the hypothesis of a loss of balance between the internal secretions has been advanced; the suprarenal being in defect, the thyroid in excess. It is a plausible idea, but such assertions are more easy to make than to prove. Routine examinations of the blood to determine the amount of adrenalin and of sugar in the circulation would afford a basis of more value than any speculations.

As the thyroid gland is believed to play a part in the fixation of salts in the tissues, it is interesting to learn that Thomas Lewis and his fellow-workers have found a deficiency of salts in the circulation of these patients when they are short of breath. All acids, including  $\text{CO}_2$ , stimulate the respiratory centre, but if we add  $\text{CO}_2$  to blood it only produces one-quarter of the change in reaction which occurs in a corresponding quantity of salt solution. This is because the sodium bicarbonate, the sodium acid phosphate, and the protein partly fix the acid, so that it loses its chemical freedom. They act as buffer salts, easing the shock of the reaction caused by the addition of acid or alkali. When these buffer salts are diminished any exertion produces excessive fatigue, giddiness, palpitation, and a high rate of pulse and respiration. They found that after the addition *in vitro* of sodium acid phosphate to the blood of such patients they obtained a dissociation curve more nearly approaching the normal. This suggests that an alteration in salt metabolism occurs in soldier's heart, and it is quite possible that such alteration is due to a disturbance of the balance between the internal secretions of the suprarenal and of the thyroid.

But if these speculations are to prove fruitful they must be followed by experimental observations; fortunately a number of skilled workers are engaged on the task, and it is to be hoped that the difficult problem will be solved. In the meantime it is important that the patients should not be treated as primarily cardiac and that they should be disabused of the idea that they are suffering from incurable heart disease.

[Dr. Langdon Brown closed his lecture with a brief reference to the Hunterian tradition as a living tradition in present-day military medicine.]

## SPECIFICITY IN ANTISEPTICS.

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AFTER two years' observation and study of several thousand cases of chronic infected wounds and their treatment, it seems to me obvious that this branch of medicine has made little progress. In spite of the numerous new or newly modified methods of treatment which have sprung up and been heralded with enthusiasm since the beginning of the war—each one claimed by its champions to be far better than any of the others—it is still impossible to say of any one method or dressing solution, "This is the best way to treat an infected wound." It is probable that this lack of success is due in part at least to the failure to consider the individual characteristics of antiseptics in relation to the types of bacteria in the wound.

This discussion is limited to the consideration of the chronic infection. The treatment of the fresh wound is a different and relatively simple problem. Here the use of antiseptics is really a prophylactic measure, an attempt to kill a small number of bacteria before they have fastened upon the wounded tissues. The bacteria occupy a relatively exposed position among already damaged cells. A single application of a strong antiseptic of the protein coagulating class may succeed in killing the bacteria without penetrating beyond the already damaged tissue which rapidly combines with it and checks its action. But this method is not applicable to wounds in which repair has already begun. Here there is no surface layer of dead cells to protect the living from the antiseptic. Consequently only weak solutions can be used, and it becomes vitally necessary to choose substances having a greater toxic action on bacteria than on human cells. Since bacteria vary widely in their structure and their biology, this substance also may be expected to vary with each species or group of bacteria. It is believed that work along more specific lines may bring about substantial progress in the antiseptic treatment of suppurating wounds. These preliminary investigations are reported for the light which they may throw on the problem.

It is the object of this paper: (1) to emphasise the need of an analytical method in the study of antiseptics; (2) to suggest that specificity in the antiseptic treatment of infected wounds is as important as specificity in the antiseptic treatment of systemic infections, such as malaria, syphilis, &c.; (3) to postulate that suppurating wounds may be treated by specific means directed against one single species or group of bacteria at a time, and that only by such a method of treatment can successful sterilisation be expected; (4) to present certain evidence that this hypothesis may be put to practical application: (a) an attempt has been made to determine the relative activity of a few antibacterial substances of varied character against different groups of bacteria by means of a study of their action upon growing cultures; (b) the results of a rather extensive observation of the bacterial flora of suppurating wounds are also presented with the view of showing certain variations in that flora under various dressing solutions.

### Requirements of Antiseptics.

The failure of antiseptics to accomplish the sterilisation of chronic suppurating wounds, which has surprised so many surgeons, has led to a widespread pessimism as to their utility. This state of mind has resulted in two divergent reactions: first, there has been a great increase in the number of antiseptics used; on the other hand, it has resulted in the development of a "physiological" school of treatment in which all antiseptics are discredited and

replaced by attempts to stimulate the normal reactions of the body against the infective process. As far as dressing solutions are concerned, the "physiological school" has limited itself to solutions of sodium chloride of varying concentrations, utilising only the physical factor of a dressing solution—viz., relative tonicity.

The difficulties in the way of success in the treatment of a chronic suppurating wound are extremely hard to overcome. The irregular structure of the wound, its pockets, the presence of foreign bodies and of fragments of tissue of various sorts which have been separated from their blood-supply make it difficult for the dressing solution to reach the foci of vegetative activity of the bacteria. For example, microscopical section of bone *esquilles*, removed from old-infected fractures in this hospital, has shown foci of bacteria within the fragments of dead bone in 80 per cent. of the cases. The methods of application are inadequate to bring a dressing solution into contact with all parts of a wound. In many cases also the bacteria are lying within the living tissue, especially between the cells and within the lymph spaces below the granulating surfaces. Here it is necessary to take into account the difficulty of the diffusion of the antiseptic through lymph channels and intercellular spaces to reach the bacteria. This diffusion must take place through a medium containing albumin; therefore the diffusion factor of the antiseptic in a menstruum of this sort is of great importance. The dressing solution must be of such a character or of such a dilution that the living cells engaged in the process of repair are not injured or repelled. It must kill or check the growth of different forms of bacteria which offer varying degrees of resistance to the antiseptic.

It is perhaps too much to ask that these multiple requirements should be fulfilled by any one substance, whether it be a saline solution or an antiseptic. It is certain that up to the present time no one solution has been discovered which has effectively combined all the properties which are demanded of a general dressing solution, nor is it likely that such a one will be discovered.

#### *Search for a General Antiseptic.*

Undoubtedly a great amount of time has been wasted in the search for an impossible combination. For many years there has been firmly fixed in the minds of laboratory workers and clinicians the idea of "general antiseptics." The term itself has been a stumbling block to progress in the treatment of wounds. It suggests that there are substances which will kill *all* low forms of vegetable life while sparing the far more delicate cells of the animal body. In other lines of medical investigation generalities and empiricism have largely given place to an analytic and specific investigation. But in the case of the treatment of infected wounds we still think and act as though any "general antiseptic" were specific treatment for "the suppurating wound." It is almost as illogical to consider the symptom of fever, no matter what its cause, as an entity and treat it with a general antipyretic as it is to treat an infected wound with a general antiseptic. Until we get rid of the term "general antiseptic," and the conception of empiric treatment which it implies, and substitute some term such as "dressing solution," which carries with it no pre-conceived ideas, we are not likely to make much progress in the specific treatment of an infected wound.

The "physiological" school falls into the same error. It limits its dressings to solutions of sodium chloride, advocating either the passive treatment with physiological saline or the active treatment with strong salt solutions. The former method is purely a negative one; the latter can hardly be termed "physiological." Its proper place is among the antiseptic methods.<sup>1</sup> Each method is applied without regard to the varied character or flora of the wound.

In the treatment of the majority of chronic infected wounds the main problem lies in destroying as far as possible the bacterial flora, consisting usually of several different groups in symbiotic or perhaps in antagonistic relationship. The different groups are sensitive in different degrees to the action of many antibacterial substances. It is possible that by the utilisation of this fact they may be combated separately by the solution to which they are most sensitive, and in this way a definite reduction of the number of organisms effected. Further work may show whether there are certain antagonistic relationships between different bacteria in a wound with which it is undesirable to interfere.

#### *Experimental Evidence.*

Dressing solutions designed to combat infection may be roughly divided into four classes: (1) bland solutions without action on proteins; (2) protein coagulators; (3) protein solvents; and (4) solutions of substances exerting on proteins a *toxic* action, which, so far as can be determined, is not primarily due to either the coagulation or solution of the protein bodies. By far the most profitable field of investigation appears to lie in this class. Here a differential action on the bacterial proteins may be expected with certain substances and specific properties utilised. An attempt has been made to investigate the bactericidal properties of a few organic acids, alkaloids, or other compounds which may be included in this group of antiseptics.

It is very difficult, with any substance, to establish the actual point of concentration which will inhibit the growth of an organism. Incomplete mixture of the medium and the antiseptic may give cause for erroneous results. Variance in the number of organisms implanted may also lead to confusion. A heavy inoculation may alter the constitution of the medium or fix a certain proportion of the antiseptic. Variations in aeration of the medium may give false results in experiments with anaerobes. The inhibition point of a particular substance varies considerably in the case of a particular organism according to the age, strain, or vegetative activity of the culture used. As far as possible it is advisable to use an actively growing young culture for all experiments with antiseptics.

The technique followed by Miss Mary Davies, who conducted the experiments in this laboratory, was as follows:—

A series of tubes was filled with equal measured amounts of a fluid medium suitable for the organism. Since the determination of the relative rather than the actual bactericidal power was desired, the simple broth media were generally used. The antiseptic to be tested was then added in decreasing quantities and the two substances thoroughly mixed in the tube. All the tubes were heavily inoculated with the same amount of an actively growing culture of the organism against which the antiseptic was being tested. They were then immediately incubated. The concentration of the antiseptic was computed in the last tube to show growth and in the first to show complete inhibition. A point midway between these two was taken as the actual concentration required to inhibit growth in the medium used.

#### *Organic Acids.*

The bactericidal effects of two groups of protein toxins were studied. The first of these groups contained what may be called the natural antiseptics—i.e., those substances often produced during the growth of an organism, an accumulation of which in the medium ultimately inhibits its vegetative activity. It is well known that the growth of most bacteria *in vitro* is self-limited. This limit is reached by a process of auto-intoxication. Among the substances acting in this manner some of the most important are the organic acids produced from the medium in which the bacteria are growing. Certain of these organic acids most commonly present in the filtrate from old cultures have therefore been tested, together with a few other organic acids, in an effort to determine the actual concentration required to check the growth of various organisms. These results are shown in Table I., which also contains the inorganic acids hydrochloric and nitric for comparison.

TABLE I.—*Approximate Concentration of Acids Required to Inhibit Growth.*

Acid.	<i>Streptococcus pyogenes.</i>	<i>Staphylococcus aureus.</i>	<i>B. pyocyaneus.</i>	<i>B. aerogenes capsulatus.</i>
Hydrochloric	0·21	0·22	0·22	0·11
Nitric ...	0·16	0·23	0·22	0·11
Acetic ...	0·31	0·29	0·08	0·11
Butyric ...	0·15	0·24	0·13	0·11
Propionic ...	0·11	0·13	0·08	0·19
Tartaric ...	0·29	0·16	0·48	0·07
Malic ...	0·21	0·16	0·12	0·04
Tannic ...	0·19	0·29	0·50	0·50

Several points appearing in this table are of interest. It may be noted that the two inorganic acids showed almost the same degree of activity in checking the growth of each organism. This similarity of action suggests that it is merely the quantity and not the quality of these acids which is of importance.

The organic acids, on the other hand, differed greatly among themselves in their effect on the growth of the various

<sup>1</sup> Mechanism of Saline Dressings, Brit. Med. Jour., Sept. 2nd, 1916.

organisms: thus, acetic acid actively inhibited the growth of the *B. pyocyanus*, was slightly less active against the gas bacillus and much less so against the cocci. Propionic acid showed a similar action in regard to the *B. pyocyanus*, was much less active against the gas bacillus, and more active against streptococcus. Butyric acid was less active against *pyocyanus*, about equally so against the gas bacillus and more active against streptococcus, though not against staphylococcus. Tartaric acid showed very little action against *pyocyanus*, was very active against the gas bacillus, but had only slight effect on streptococcus. Malic acid resembled tartaric in its action on the cocci, but was fairly active against the *B. pyocyanus* and most active of all against the gas bacillus. Tannic acid showed only a slight activity against the cocci, and appeared to have no activity against the *B. pyocyanus* and the gas bacillus.

It may be concluded, therefore, that at least among the common organic acids there is a great variation or specificity in their activity toward different organisms. Further work may show to what extent this specificity is inherent in the particular products of each bacterium's growth.

#### *Antiseptics.*

Only a small group of substances of a recognised antiseptic value was examined. It comprised carbolic acid, cresol, thymol, Dakin's solution, quinine hydrochloride, ammonium and sodium fluorides, salicylic acid and sodium chloride.

TABLE II.—Approximate Concentrations of Certain Antiseptics Required to Inhibit Growth.

Antiseptic.	Streptococcus pyogenes.	Staphylococcus aureus.	B. pyocyanus.	B. aerogenes capsulatus.
Carbolic acid	0·07	0·26	0·10	Variation 0·65 to 2·00
Cresol	0·06	0·09	0·06	0·26
Thymol	0·08	0·16	0·5+	0·26
Dakin's solution*	3·42	17·60	34·34	Variation 28·62 to 50·00
Quinine hydrochloride	0·15	0·41	0·77	Variation 0·07 to 0·19
Ammonium fluoride	0·30	0·24	0·24	0·36
Sodium fluoride	0·17	0·08	0·17	0·30
Salicylic acid	0·47+	0·28	0·47+	0·08
Sodium chloride	5·51	14·28+	14·60+	4·00

\* The figures represent percentages of the solution. Since it is a complex solution it is difficult to determine the actual bactericidal value of each constituent.

Here again great variation was found in the activity of these substances on different organisms. Carbolic and cresol proved more active against the streptococcus than against the staphylococcus, and showed very little activity against the gas bacillus. Thymol showed a fair degree of activity against the streptococcus, was less active against the staphylococcus, still less so against the gas bacillus, and showed practically no action upon *pyocyanus*. Dakin's solution showed a moderate activity against the staphylococcus, was nearly inert against the *B. pyocyanus* and the gas bacillus, but was more active against the streptococcus. Quinine showed its greatest activity against the gas bacillus, was fairly active against the streptococcus, but showed very little action upon the staphylococcus and still less upon the *B. pyocyanus*. Sodium fluoride was more active than ammonium fluoride throughout. Both showed themselves active against the gas bacillus, but less effective against the other three organisms. Salicylic acid showed very little activity against streptococcus, *pyocyanus*, or staphylococcus, but was fairly active against the gas bacillus. The concentration of sodium chloride required to inhibit the growth of these four organisms also varied considerably. About 4 per cent. was required to prevent the growth of the gas bacillus, a slightly higher concentration to inhibit streptococcus, and 14 per cent. failed to inhibit the growth of the other two organisms.

Here again is plainly manifested the great variation in the activity of some of our "general antiseptics" toward the common bacteria of infected wounds. *Bactericidal values are relatively specific and not general.*

#### *Clinical Evidence.*

In order to study the effects of some of these dressing solutions on the flora of chronic suppurating wounds a series of 165 cases was divided into approximately equal numbers, and each group treated with one solution for a period of five weeks. Practically all these cases fell into the class

of chronic infection. Most were complicated with bone necrosis. The first examination was made, on an average, about two weeks after injury. The wounds were examined by Dr. B. H. Buxton of this laboratory at intervals of about seven days, and the aerobic and anaerobic flora recorded. The bacteria were classified by group only, notes being kept of the presence of the *B. aerogenes capsulatus* group, the streptococcus group, the staphylococcus group, the *B. pyocyanus* and diphtheroid bacilli. No attempt was made to classify the varieties of any group.

The percentage incidence of each group at the various periods of examination is given in Table III. This percentage is the average of the whole number of cases treated by all the dressing solutions. About 50 cases which remained on dry dressings throughout the same period showed almost identical percentages for each group as those given in the table.

TABLE III.—Percentage Incidence of Certain Groups of Organisms in Chronic Suppurating Wounds.

No. of cases.	Day.	<i>B. aerogenes capsulatus.</i>	Strepto-cocci.	Staphy-lococci.	<i>Pyocy-anus.</i>	<i>Proteus</i>	Diphther-ooids.
163	1st	12 per cent.	65 per cent.	66 per cent.	42 per cent.	28 per cent.	23 per cent.
120	7th	7	67	62	43	23	18
115	14th	6	68	61	44	18	16
86	21st	7	69	59	38	30	17
76	28 <sup>th</sup>	1	68	49	32	39	20
52	35th	0	69	71	35	29	15
612	—	5 average	68 average	61 average	39 average	28 average	18 average
Easams.	—						

There are several points of interest which may be noted from an analysis of Table III. First, the percentage incidence for streptococci, staphylococci, and the *B. proteus* is remarkably constant throughout the period of observation. This is specially marked in the case of streptococci, which does not vary more than 4 per cent. In the case of the gas bacillus, the *B. pyocyanus*, and the diphtheroid bacilli, there is a slow decline in incidence from the first to the last examination, although in the case of the *B. pyocyanus* there appears at first to be a slight increase in frequency. The low percentage of the gas bacillus throughout the series is that to be expected in cases which come under observation after the acute stage is past.<sup>2</sup>

A summary of these examinations furnishes a fairly definite standard with which to compare the incidence of these groups of organisms in the cases treated with each dressing solution. The percentages are so constant that any marked variation under any particular treatment becomes readily apparent.

Among these dressings were; (1) Dakin's solution, quinine hydrochloride, 0·5 per cent.; (2) physiological saline; (3) hypertonic saline, 5 per cent.; (4) hypotonic saline; (5) acetic acid, 1 per cent.; (6) bicarbonate of soda, 1 per cent.; (7) cresol, 1/10 per cent.; (8) benzoic acid, 0·5 per cent.; each of the last four being made up with a basis of physiological saline.

No one of these solutions affected the percentage incidence of all the groups of organisms listed in Table III. As is perhaps to be expected, physiological saline produced no alteration in the percentage incidence of any group. The cases under certain other solutions, however, showed distinct variations in the incidence of one or more groups of organisms. This may be best shown by the charts of each organism and its occurrence among the cases under those solutions as compared with the average percentage. Table IV. shows only those variations from the average which are worthy of comment. The solutions which failed to alter the incidence of an organism are omitted from the table of that group.

In the case of the *B. pyocyanus* there was an increase in incidence of the organism in the series of wounds dressed by Dakin's solution, quinine hydrochloride and bicarbonate of soda; and a sharp decrease in those dressed by acetic acid. This is in harmony with the clinical observations as well as with the *in vitro* tests. The occurrence of green pus has been frequently observed with the three former solutions,

<sup>2</sup> Observations on the Pathology and Bacteriology of Gas Gangrene, Journal of Pathology and Bacteriology, vol. xx., 1916.

and the use of acetic acid has proved very efficient in eliminating it.<sup>3</sup> The streptococcus group showed a slight decrease with the bicarbonate dressings. No effect appears to have been produced upon the incidence of the organism by the other dressing solutions, with the exception of cresol.

TABLE IV.—Percentage Incidence of *B. pyocyaneus*, *Streptococci*, *Staphylococci*, and *B. aerogenes capsulatus* (Welch) in Wounds under Various Dressing Solutions compared with the Average Incidence of each Organism.

Day examined.	<i>B. pyocyaneus</i> .				<i>Streptococci</i> .				<i>Staphylococci</i> .				<i>B. aerogenes capsulatus</i> .			
	Average % all dressings.		Per cent.		Hypotonic cases.		Per cent.		Average % all dressings.		Pr. et.		Dry dressings.		Pr. et.	
	Dakin cases.	Quinine cases.	Bicarb. cases.	Acetic cases.	Cresol cases.	Bicarb. cases.	Cresol cases.	Dakin cases.	Cresol cases.	Dakin cases.	Quinine cases.	Dakin cases.	Cresol cases.	Dakin cases.	Quinine cases.	
1	42	33	50	29	35	65	50	82	71	66	73	77	12	2	20	
14	43	80	54	23	22	67	71	88	66	62	50	90	7	2	0	
21	44	65	49	83	11	68	89	88	75	61	63	50	6	3	0	
28	38	60	37	50	0	69	88	88	50	59	50	35	7	7	0	
35	32	60	43	35	0	68	83	86	50	49	43	40	1	4	0	
	35	55	60	—	0	69	86	100	—	71	40	—	—	—	—	

and hypotonic saline, where there seems to have been a slight increase in the percentage.

Staphylococcus showed a slight decrease among the cases dressed with Dakin's solution or cresol. It seems to have been little affected by the other dressings.

In the case of the gas bacillus no effect seems to have been produced by any of the dressing solutions with the exception of quinine, where the early disappearance of the organism was strikingly apparent. This result is consistent with earlier experience with this alkaloid, both *in vitro* and in clinical application.<sup>4</sup> With this organism there appeared to be a higher incidence among the cases on dry dressings than among those on any of the dressing solutions.

In spite of the fact, therefore, that our methods of applying antisepsics are still very inadequate and their efficiency as dressing solutions greatly hampered, definite effects on the bacterial flora of the wounds were obtained. Furthermore, these effects were evidenced in no case upon the bacterial flora *in toto* but upon one or more species of bacteria at a time—those for which the dressing was most specific. The failure to produce a greater effect upon the streptococci and staphylococci may have been due to a deeper distribution of these organisms in the tissues, or, the other factors being equal, to the failure to use an antiseptic having an exceptional bactericidal value for those particular groups. Possibly a wider choice of dressing solutions would have shown antisepsics with this property.

#### Summary.

It has been suggested that the specific method of treatment is applicable to wound infection as well as to systemic infection. Some instances of the variation of antisepsics in their activity against different bacteria *in vitro* have been offered in support of the principle. A large number of bacteriological examinations of wounds under treatment with different solutions has been recorded and instances of the specific action of certain dressing solutions demonstrated.

It is believed that further analytical study of antisepsics will result in the discovery of dressings specific for one or more groups of bacteria. By a successive application of these dressings the organisms present in the wound may be reduced in number or eliminated one variety at a time, and true sterilisation of a suppurating wound accomplished. But first the concept of the "general antiseptic" must go by the board and the search for a cure-all be recognised as unprofitable.

It is a pleasure to express my acknowledgments to Dr. Joseph A. Blake for his advice and criticism, and to Miss Mary Davies and Dr. B. H. Buxton for their large share in the technical part of this work.

<sup>3</sup> Treatment of *Bacillus Pyocyaneus* Infection, Journal of the American Medical Association, Nov. 25th, 1916, vol. lxvii, p. 1598.

<sup>4</sup> Use of Quinine in the Treatment of Experimental Gas Gangrene, THE LANCET, Sept. 4th, 1915, p. 538. Use of Quinine Hydrochloride Solution as a Dressing for Infected Wounds, Brit. Med. Jour., Dec. 25th, 1915.

## INTESTINAL PROTOZOA IN SALONIKA WAR AREA.

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(Report to Medical Research Committee.)

DURING the months of August, September, and October, 1916, I had the opportunity of examining the stools of 893 cases of diarrhoea and dysentery among the troops of the Salonika war area. Some of these cases had their stools examined two or three times weekly, but the great majority of them not more than once. This work was all part of the routine laboratory examination of stools of patients suffering from diarrhoea or dysentery in three of the general hospitals in this area.

Troops of the Salonika zone of the Eastern Mediterranean have suffered severely from diarrhoea and dysentery. These infections started about the month of May, 1916. They have continued, with slight variations, up to the present. These variations, I think, are mainly due to climatic changes. The great spreaders of diarrhoea and dysenteries are flies. Heat and moisture are necessary for these pests to thrive. In the very hot spells, when everything was dried up, flies became less numerous. On the contrary, during a cold spell, their numbers were markedly diminished, and in these periods there was decidedly less diarrhoea and dysentery.

Bacillary dysentery was the predominant type, but there were quite a number of acute amoebic cases. It is a remarkable thing there were not more, inasmuch as many of the troops, particularly those which had come from Gallipoli and Egypt, were carriers of *Entamoeba histolytica*. Microscopical examinations of the stools of these troops in Egypt, Malta, and Salonika continually showed evidence of this.

#### Table of Findings.

Number of cases examined, 893; number of examinations, 1425.

E.F.	Non-pathogenic amoebae (81).		Pathogenic amoebae (84).		Flagellate protozoa (217).				Coccidia (18).	
	Ent. hist.	Ent. hist. cystis.	Ent. hist.	Ent. minuta	Ent. min. cysts.	Lamblia	Lamblia cystis.	Tetramitus.	Tetram.	Cerco-
39	42	39	21	16	29	18	29	44	72	18

By E.F. (free amoebæ), we mean amoebæ found in fresh specimens of stools in a resting or precystic stage. This group includes cases in which there was no time for staining, nor was further examination possible for a more complete diagnosis.

#### Amoebic Dysentery.

As is seen in the above table, *Ent. histolytica* was present in 37 cases. In two of these it was found post mortem. In one the patient died two hours after admittance to hospital. There were six perforations in the large gut and typical lesions of acute amoebic dysentery, from which different scrapings showed large numbers of *Ent. histolytica*. This patient had never been in Egypt or Gallipoli or other infected area, and he did not belong to a division that had been in one, nor was he in camp with any troops known to be infected.

The second case died from sepsis, the result of a severe gunshot wound of the thigh. In the routine post-mortem examination of the organs the gut showed signs of acute amoebic dysentery, and scrapings from it showed *Ent. histolytica*. This patient had also never been in any infected area.

In cases where *Ent. minuta* was found a history of recurrent diarrhoea was usually given. The stools were faecal with mucus, but seldom was there blood. These patients, one generally found, had been in Gallipoli or in Egypt. As well as the *Ent. minuta*, but included in the table under that category, I found in a few cases a specially small form of amoeba with its cyst, a type which had been demonstrated to me in Egypt by Lieutenant-Colonel Wenyon, R.A.M.C., and which has been described by him. Cases

where any type of *Ent. histolytica* was found in the stools were treated in the ordinary way with emetine (1 gr. hypodermically daily for 12 days).

War-time exigencies did not allow of all patients being retained in hospital after their course of treatment was concluded, so that further examination for cysts was impossible. Seven patients, however, in whose stools *Ent. histolytica* cysts were found to persist after their emetic course were further treated with Dale's double iodide of emetine and bismuth. These cases were discussed in THE LANCET of Jan 6th, p. 17. Eight of the *Ent. histolytica* patients had also a bacillary infection. In all but one it was of the Flexner type.

*Ameba coli*, considering how commonly they are found in the gut, may be said to have been present only in a small percentage of cases.

#### Flagellate Protozoa.

In almost all cases where any of the flagellate protozoa were found there was mucus mixed with faecal matter; in a very few cases there was blood and mucus only. *Tetramitus mesnili* was the flagellate most commonly present, more often in its flagellate than in its cystic stage. This was due, I think, to the fact that the patient's stool was examined soon after the diarrhoea commenced and before the slowly-forming oysts had time to develop. Repeated examinations of the stools were not possible, but in patients who remained in hospital for some time, and in whom further search could be made, *tetramitus* cysts were found.

*Lamblia intestinalis* was a common infection, the cystic form being more often present than the flagellate form. This is due, I think, to this fact, that lamblias attaching themselves by their suckers to the mucous membrane of the duodenum and jejunum are difficult to detach therefrom by the action of drugs. On the other hand, their cysts, which are free and mixed up with the intestinal contents, are readily washed down by aperients. Five of the cases of lamblia infection I was able to examine weekly during three months, and despite all treatment they continue to discharge lamblia cysts up to the present time.

*Trichomonas* was found in comparatively few cases. This is peculiar, as this parasite is so often present in the stools of people living in tropical and subtropical climates. In one case where I found trichomonas and cercomonas flagellates in the stools of a patient who subsequently died from pyæmia these flagellates were found post mortem, both in scrapings from the large bowel and in the faecal contents.

*Coccidia* were found in 18 stools. In this infection mucus was always present in the stools. As a rule, these parasites disappeared within a few days, but in one patient they were found in daily examinations for three weeks.

The lamblia and *tetramitus* infections were the most difficult to get rid of. Calomel, bismuth, thymol, salol, turpentine, emetine, and Dale's double emetine were amongst the drugs tried without any result. Rectal irrigations with quinine, turpentine, eusol did not lessen the infection.

## METHOD OF PLASTER SPLINTING FOR THE TREATMENT OF KNEE-LESIONS.

BY GEORGE DAVIS, M.D., B.S. DURH., M.R.C.S., &c.,  
CAPTAIN, R.A.M.C., SURGICAL SPECIALIST TO THE MILITARY HOSPITAL, EASTBOURNE.

ESSENTIALLY this method is a thigh plaster and leg plaster conjoined by three equidistant arches of hoop-iron. The points of the method are:-1. That the interrupting supports radiate from a point in the centre of the limb and resist mobility equally in all planes. 2. The iron-hoops being covered with plaster become one with the splint, are much strengthened and much smoother, and less awkward. 3. There is quite free room for dressings, however bulky. The splint can be made much more serviceable by having an extension of plaster around the pelvis—a spica. The technique is the outcome of my own attempts.

The splint is especially suitable for all cases of long-continued suppuration of the knee and for cases of resection of the knee-joint. Also where the tibia is fractured into the knee or where infection has reached the joint from a wound in the tibia. It will be most useful where fibrous ankylosis

is the best prognosis permissible from the nature of the injury. Such cases often last many months, entailing intense suffering. Unless the limb is fixed without mobility a bad alignment results from muscular action, when the ligaments of the joint are softened by long-continued suppuration. I have seen such dislocations outwards and backwards, and the only possible treatment was to amputate at the thigh.

The only other splints that would occur to any surgeon in this class of case are: The Wallace-Maybury; this is bad, since it tends to separate the opposing bony surfaces of the joint, and it allows the knee to sag down at each dressing. The same remarks apply to the Thomas. Of course, the use of the Balkan splint with this splint is obviously the best treatment in conjunction with this fixing apparatus.

The materials required are:—

1. For covering the leg: two cotton bandages, one flannel roller, and four strips of mackintosh 7 in. wide and of sufficient length to encircle the limb, with 2 in. overlap at each of the four edges of the plaster splint.
2. Eight plaster bandages and some 2 or 3 lb. of loose plaster, three bowls, a wooden stirrer, and some warm water.
3. A piece of charcoal or charred stick for marking the leg and the plaster, &c.
4. The iron-hoop arches made with flanges for fixing are of the following gauge and dimensions: Breadth, 1½ in.; length, the arch span, i.e., the distance of 2 in. above and below the extreme wound, included. The flanges 3½ in., and turned slightly upwards at their extreme end. The arch is to be 4 in. high, and the sides of the arch drop vertically to the flange. The gauge should be ½ in., and if made of malleable iron can be easily bent and adapted by the fingers.
5. Half-pint of boiled linseed-oil "driers," ½ pint of spirit varnish, and two brushes to apply these.
6. Some strapping to fix the endings of bandages, &c.

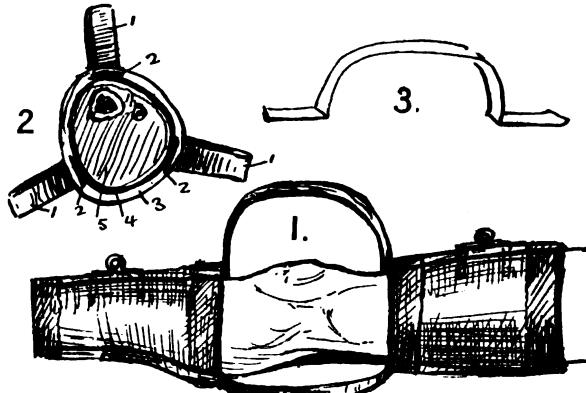


FIG. 1.—Inner side of leg and thigh, showing splint applied and coat-sleeve mackintosh and rings of wire to affix to Balkan.  
FIG. 2.—Section of leg seen from below with plaster and iron arches.  
1. Arches of hoop-iron. 2. Flanges in thickness of plaster. 3. Plaster of Paris. 4. Flannel roller. 5. Section of upper part of leg.  
FIG. 3.—The hoop-iron arches.

The detailed technique is as follows (Figs. 1-3):—

1. Anæsthetise the patient.
2. Mark the limits to be reached by the plaster. Dress the wound and bandage firmly. Pass a cotton roller over the area to be covered by the plaster, at the same time fixing the mackintosh strips, and protecting any old healed wounds, that will be covered by the plaster, with gauze squares. Over this put a layer of flannel roller, fastening off with a piece of strapping.
3. Plaster bandages are applied to the thigh and leg, above and below the marks, and made of three thicknesses of bandage. This must "set" before proceeding.
4. Sling the limb to the Balkan splint and have two capable persons to hold the limb both as to lateral form and axial alignment, under the continued supervision of the surgeon.
5. The irons are covered with a layer of cotton bandage and marked 1, 2, and 3 at their upper flanges. Take them in order, and having marked with charcoal three equidistant lines on the newly set plasters, fit each iron to its proper place by slight bending and axial twisting. When they ride truly make a complete outline of the site of each on the plaster, numbering each place.
6. The irons are now fixed, first all at one end and then at the other, by means of plaster bandages; further bandages are added until a thickness giving the required stability is

produced. The leg splint need not reach lower than to 4 in. above the malleoli.

7. Each metal bridge is now covered with plaster bandage round and round, until by working the surface with wet fingers the required smoothness is attained and the junction with the splint made perfect.

8. The mackintosh slips are turned back coat-sleeve wise, the stuff being cut when interrupted by the irons. The various parts are slightly fixed with strapping.

9. When quite dry the driers are applied, and over this, when hard, the spirit varnish, all over the whole plaster surface. This makes it resistant to everything short of continual soaking or the abundant use of peroxide of hydrogen, and prevents the troublesome shedding of powdery particles from the plaster surface.

The splint so prepared should be very comfortable and a welcome support. It should last 4 to 7 weeks, by which time further progressive emaciation of the limb may require a fresh splint to be made. The limb, splint and all, is slung from a Balkan frame. The dressings can be done with the minimum of pain, and the perfect alignment of the limb is assured. The patient can bear to have the limb handled and be moved on to a couch or spinal chair and so improve in health and spirits by being out in the open air.

It is easy to make additions to this apparatus, either of a plaster to include the foot or one to surround the pelvic girdle, or both.

My acknowledgments are due to Major Madrange, A.M.C., 1st Army Corps, and to Colonel G. S. Robinson, S.G., O.C. i/c Military Hospital, Eastbourne, for permission to publish this paper.

## NOTES ON THE STARVATION TREATMENT OF A YOUNG DIABETIC.

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*Remarks by E. HOBHOUSE, M.D. Oxon., F.R.C.P. Lond., Lieutenant-Colonel, R.A.M.C., T., Physician to the Hospital.*

A BOY, aged 16, admitted to the Royal Sussex County Hospital under Lieut.-Col. Hobhouse on Jan. 8th, 1916, complained of great thirst and wasting; this had been going on for two months. Family history excellent; no other member had had diabetes. He remained in hospital 6 weeks on full diet except that bread, sugar, potatoes, and fruit were allowed in very small quantities. On admission he weighed 6 st. 10 $\frac{1}{2}$  lb.; when discharged on Feb. 15th he was 1 lb. heavier. The reports on his urine on admission and when he left were: specific gravity, 1042, 1030; acid; sugar, 4 $\frac{1}{2}$  per cent., 4 per cent.; acetone and diacetic acid absent. Treatment with bile and pancreatic tablets had no effect on the amount of sugar in his urine.

On July 7th he was readmitted with a view to trying the starvation treatment. He was very much the same as when he went out, but had lost a pound in weight. Urine: specific gravity 1035, acid, sugar 4 per cent., no acetone or diacetic acid. He was kept to bed for a fortnight, when he was up on a chair for a short while. Each day he was allowed to do more, until by the time of discharge he was taking long walks morning and afternoon. His urine, on admission very acid, was kept neutral all the while by bicarbonate of soda, as much as 50 grains being given every four hours at one time.

The following shows his variation in weight during his stay of two months. He was weighed naked early in the morning after he had passed urine on each occasion.

July 23 ...	6 st. 10 lb. 4 oz.	Sept. 3 ...	7 st.
" 30 ...	6 st. 9 lb. 8 oz.	" 10 ...	7 st. 2 lb.
Aug. 6 ...	6 st. 4 lb.	" 17 ...	7 st. 3 lb.
" 13 ...	6 st. 7 lb. 8 oz.	" 22 ...	7 st. 6 lb. 8 oz.
" 20 ...	6 st. 9 lb. 12 oz.	" 28 ...	7 st. 10 lb.
" 28 ...	6 st. 12 lb. 8 oz.		

From August 6th to Sept. 25th he gained over a stone in weight. During this time his urine did not reduce Fehling's solution, and only by a more delicate test could a trace of sugar be detected occasionally. He left the hospital on Sept. 25th in perfect health, with no sugar, acetone, or diacetic acid in his urine, and with his weight increasing weekly.

Since leaving hospital four months ago the boy has gained 2 $\frac{1}{2}$  lb. in weight, has started learning motor engineering, and his urine still remains free from sugar, acetone, and diacetic acid.

### Details of Diet and Analysis of Urine.

Date.	Urine.			Diet.
	Sugar.	Acetone.	Diacetic acid	
July 23	4 $\frac{1}{2}$ %	Absent	Absent	Black coffee, 4 oz., whisky, 2 dr. 4-hourly.
" 24	Absent	Present	Present	See below (1).
" 25	"	Absent	Absent	Rep. diet of July 25th.
" 26	"	Trace	Trace	Rep. and add meat 3 oz.
" 27	Present	Present	Present	Diet as on July 23rd.
" 28	Absent	Absent	Trace	Rep. diet of July 25th.
" 29	"	Trace	Absent	" "
" 30	"	Absent	"	See below (2).
" 31	"	Absent	"	Rep. diet of August 1st.
Aug. 1	"	Trace	"	" "
" 2	"	Present	Trace	" "
" 3	"	Absent	Absent	See below (3).
" 4	"	"	"	Rep. diet of August 5th.
" 5	"	"	"	" "
" 6	"	"	"	" "
" 7	"	"	"	" "
" 8	"	"	"	" "
" 9	"	"	"	" "
" 10	"	"	Trace	" "
" 11	"	"	Absent	" "
" 12	"	"	Trace	" "
" 13	Trace	"	"	Cod-liver oil, 1 dr. t.d.s.
" 14	Absent	"	"	Rep. diet of August 5th.
" 15	Trace	"	Absent	" "
" 16	Absent	"	"	" "
" 17	"	"	"	" "
" 18	"	"	"	" "
" 19	"	"	"	See below (4).
" 20	Trace	"	"	" "
" 21	"	"	"	" "
Sept. 2	Absent	"	"	Rep. diet of August 20th.
" 3	Trace	"	"	Cod-liver oil, 2 dr., t.d.s.
" 4	"	"	"	See below (5).
" 5	Absent	"	"	Rep. diet of Sept. 4th.
" 25	"	"	"	" "

(1) July 25th:—6 A.M.: cocoa (with little milk) 8 oz., 1 egg. 9 A.M.: black coffee 6 oz., whisky 2 dr. 12.30 P.M.: lettuce; greens or cucumber; 1 egg. 4 P.M.: tea (with little milk) 8 oz. 7 P.M.: lettuce or cucumber; black coffee 2 dr.

(2) August 1:—6 A.M.: cocoa 8 oz., 1 egg. 9 A.M.: black coffee 6 oz., whisky 2 dr. 12.30 P.M.: meat 3 oz., greens. 4 P.M.: tea 8 oz. 7 P.M.: lettuce or cucumber; black coffee 6 oz., whisky 2 dr.

(3) August 5th:—6 A.M.: Cocoa 8 oz., 2 rashers of bacon, 2 eggs, lettuce. 9 A.M.: Black coffee 6 oz., whisky 2 dr. 12.30 P.M.: Meat 4 oz., greens; custard pudding (unsweetened); 1 apple. 4 P.M.: Tea 8 oz., 1 egg.

7 P.M.: Soup  $\frac{1}{2}$  pt. or boiled macaroni; lettuce. 8.30 P.M.: milk  $\frac{1}{2}$  pt.

(4) August 20th:—6 A.M.: Cocoa 8 oz., 1 roll gluten bread, 3 rashers of bacon, 2 eggs; or fish and 2 eggs; cucumber or lettuce. 9 A.M.: Coffee and milk 8 oz. 12.30 P.M.: Meat 6 oz., greens; 1 apple or banana; custard pudding; milk  $\frac{1}{2}$  pt. 4 P.M.: Tea 8 oz., 1 egg, 1 roll gluten bread, butter 1 oz. 7 P.M.: Soup  $\frac{1}{2}$  pt. or boiled macaroni; 1 apple or banana; 1 roll gluten bread, butter 1 oz., cheese 1 oz. 8.30 P.M.: Milk  $\frac{1}{2}$  pt., 1 water biscuit.

(5) Sept. 4th:—6 A.M.: Cocoa and milk 8 oz., 3 rashers of bacon, 2 eggs, or fish and eggs; 1 roll of gluten bread; 1 apple or banana. 9 A.M.: Coffee and milk 8 oz. 12.30 P.M.: Meat 6 oz., greens; rice, sago, or tapioca pudding; 1 apple or 1 banana; 1 roll gluten bread; milk  $\frac{1}{2}$  pt. 4 P.M.: Tea and milk 8 oz., 1 egg, 1 roll gluten bread, butter 1 oz. 7 P.M.: Soup  $\frac{1}{2}$  pt. or boiled macaroni; 1 apple or banana; 1 roll gluten bread, butter 1 oz., cheese 1 oz. 8.30 P.M.: Milk  $\frac{1}{2}$  pt., 1 water biscuit.

*Remarks by Lieut.-Col. HOBHOUSE.*—The above account is of interest as showing the effect of starvation on a class of cases which are usually of a very hopeless character. The credit of managing and regulating the diet belongs entirely to Mr. Fenwick. One point of some interest is that acetone and diacetic acid were absent until the starvation diet was commenced, and then continued to appear intermittently for over three weeks, sugar being generally absent. I do not know what the explanation of this may be, whether it is due to the starvation itself or to something in the diet. The quantities present were always small. The case cannot be classed as one of the most severe, though the emaciation and weakness were great when the boy came in for the second time.

**CITY OF LONDON TRUSS SOCIETY.**—At the annual general meeting of this society, held on Feb. 7th at 5, Finsbury-square, it was stated that 5221 patients had been treated during 1916 and that 1100 trusses had been specially made to order.

**THE CONTROL OF TUBERCULOSIS IN IRELAND.**—Our Belfast Correspondent writes: At a recent meeting in Omagh Dr. E. C. Thompson drew attention to the bad effect of sending advanced cases of pulmonary consumption from the County Tyrone Sanatorium Home, a course which simply leads to spreading of the disease. It is to be feared that this practice, combined with the farcical type of notification of tuberculosis in vogue in Ireland, will in the end lead to very slight improvement in the incidence of the disease.

## Medical Societies.

### ROYAL SOCIETY OF MEDICINE.

#### SECTIONS OF OTOTOLOGY AND NEUROLOGY.

##### *War Injuries and Neuroses of Otological Interest.*

A MEETING of the Section of Otology, to which members of the Section of Neurology were invited, was held on Feb. 16th, when a discussion on the above subject was opened by Mr. H. J. MARRIAGE, President of the Section of Otology.

Mr. MARRIAGE said that his remarks were based upon notes of cases kindly sent to him by Mr. Arthur Cheatle, Mr. E. D. D. Davis, Mr. Somerville Hastings, Mr. Pike, and Dr. W. S. Syme, and also on an excellent paper published by Mr. Logan Turner, Mr. J. S. Fraser, and Mr. W. G. Porter, a copy of which was sent to him by Mr. Fraser, in addition to cases which he had seen himself. The subject was dealt with under four main headings, a number of illustrative cases by various observers being recorded. I. (a) Wounds of the auricle. In these cases all that was usually required was to clean up the wound, remove fragments of metal, and apply antiseptic dressings. If the damage was very extensive it was often possible to save the greater part of the ear by performing a plastic operation. (b) Wounds of the external meatus were usually caused by missiles which entered either in front or behind the ear and passed right through the meatus; the cartilaginous meatus appeared most frequently affected, though at times the bony canal might also be damaged. In its course the missile often injured the facial nerve and might also injure more or less the mastoid process. Cicatricial stenosis of the meatus very commonly resulted in these cases if there was extensive injury and would cause some deafness, and there might be some internal ear deafness. II. Injuries of middle ear. Rupture of the tympanic membrane had been very common, mainly due to high explosive. The perforation occurred in the membrana tensa; the rupture seemed to be most frequent in the lower half of the drum. The size varied from a small pin's head to the loss of half the drum. In cases seen within a few days of the injury the edges were ragged and covered with dried blood, but later the edges became quite smooth. The commonest symptoms were marked deafness with at times loss of consciousness for a few minutes and often slight bleeding from the ear which might be followed by a little serous discharge; rarely there might be tinnitus and slight vertigo due to involvement of internal ear. In most cases when tested with tuning-fork (C) even a few days after injury bone conduction was normal, but air conduction was diminished, varying according to extent of damage; in several cases air conduction was also slightly subnormal when tested with tuning-fork (C'). Complete loss of hearing had not been observed in any reports which had come under the speaker's observation. If no suppuration took place he found healing occurred in 1 to 3 months; E. D. D. Davis gave the time as 5 to 10 weeks. As regards the frequency of middle-ear infection Mr. Marriage was not able to give any satisfactory statistics, but in the cases seen by him about 30 per cent. had discharge when admitted to hospital over here. The majority healed quite well, with good recovery of hearing; two cases required operation on the mastoid. The usual treatment for ruptured drums adopted over here had been to disinfect the meatus and to keep it plugged with gauze or wool, avoiding all syringing and drops. Somerville Hastings reported an interesting case of hemorrhage into the middle ear, and Cheatle also reported a case due to parachute descent. Nothing was done in the way of treatment, and in about a month the blood had become absorbed and the hearing had returned. III. Injuries of internal ear. (a) Direct injury of labyrinth by a missile. These wounds as a rule were fatal, but in a few cases the patient had survived, and Cheatle had reported a particularly interesting one, in which a rifle bullet entered the left temporal region above the zygoma and emerged just to the left of the second cervical vertebra. (b) Indirect injury of labyrinth in fracture of skull might be caused by falls, blows on the head, or by bullet wounds. Syme and Fraser state in their paper:—

If the force is applied at the side of the head in the direction of the petrous pyramid we get a longitudinal fracture

which usually runs along the roof of the middle-ear cleft and, as a rule, in these cases the labyrinth capsule remains intact; if, on the other hand, the force is applied at the back of the head we get a transverse fracture which runs at right angles to the long axis of the petrous pyramid and always injures the labyrinth. As a rule, these fractures pass through the vestibule. The symptoms of such injuries are extreme or total deafness, marked disturbance of balancing, with loss of the cochlear and vestibular functions. If the labyrinth is injured there is an escape of cerebro-spinal fluid along with the blood. In the cases in which the labyrinth capsule is not injured there is no escape of cerebro-spinal fluid; but, nevertheless, deafness results from haemorrhage into—or tearing of—the eighth nerve. One or two of the cases with fracture of the labyrinth have been microscopically examined many years after the accident, and filling up of the hollow spaces of the labyrinth by new connective tissue and bone has been found, along with secondary degenerative atrophy of the nerve structure.

(c) Concussion deafness might be due to constant gunfire day after day or to explosion near the patient of a shell. In the former case, in the speaker's experience, a slight amount of permanent deafness usually persisted after frequent exposure to noise for long periods. The deafness due to the explosion of a shell was generally for a short time very severe and at times the patient had been rendered unconscious, but as far as he knew the deafness had never been absolute. The symptoms and state of hearing were described. The drums were normal. A large proportion of these patients recovered their hearing in the course of one or two months, but others improved very little. The treatment he had adopted in these cases was complete rest in bed, with the administration of bromides in the early stages and later strychnine. As regards prognosis, as far as he could judge from cases seen, if marked improvement did not occur within six to eight weeks the outlook was distinctly bad. Even when the hearing returned tinnitus often persisted. The exact lesion was probably chiefly peripheral. IV. Psychical deafness was usually bilateral and was commonly seen in those who had suffered a severe shock—e.g., by being buried by a shell—without any visible injury. Deafness was usually absolute, nothing being heard either by air or bone conduction. It was generally accompanied by other nervous signs and symptoms, such as loss of voice, narrowing of the field of vision, tremors, irregular paralyses, and areas of anaesthesia. Spontaneous nystagmus was absent. These cases often recovered with a counter-shock, with rest and massage, or by giving an anaesthetic; at times asafoetida and valerian were useful. To distinguish this form of deafness from malingering was sometimes difficult, but it could generally be accomplished if a thorough examination was made. Finally, he said he believed that obturators were of distinct benefit in saving the hearing, and that one of the simplest and best forms was plasticine wrapped in gauze; this could be moulded to the shape of the external meatus, and was easily put in and withdrawn. Plugs made of celluloid should never be used.

Mr. SYDNEY SCOTT showed (for Mr. J. S. FRASER) an interesting series of photomicrographs of cases in ear injury.

Colonel H. F. BIRKETT, C.B., spoke of the work which had been done at his hospital, in conjunction with Dr. Gordon Wilson, in which institution were 55 beds set apart for this class of injury. He briefly indicated the lines on which the various cases were treated.

Dr. GORDON WILSON said he had the records of over 100 cases of nerve deafness, and he had seen in France a number of cases of concussion deafness soon after the condition occurred. The cases of ear trouble were divided into three groups: (1) cases of nerve deafness; (2) cases with a fixed idea that they could not hear; (3) malingerers. Some cases presented the problem as to whether they were cerebellar disease or labyrinthine wound. Some of the most difficult cases had been those in which the facial nerve had been cut outside the ear.

Mr. O. E. WEST referred to cases in which both the hearing and the visual fields were contracted in the same patient. Though he had done a considerable amount of war work, there were comparatively few cases of direct injury to the ear. He narrated several interesting cases.

Dr. DUNDAS GRANT also remarked on the few cases of clear-cut labyrinthine injury in the war. When the tympanic membrane was ruptured involvement of the labyrinth had been but slight. He discussed the guides to prognosis which he had found useful in his cases, and traversed the general subject.

Major G. P. SHUTER, Dr. C. E. JONES-PHILLIPSON, Mr. SYDNEY SCOTT, Mr. E. D. D. DAVIS, Mr. HUNTER TOD, Mr. SOMERVILLE HASTINGS, and Mr. W. M. MOLLISON continued the discussion.

#### SECTION OF PATHOLOGY.

*The Central Nervous System in Hypothyroidism.—An Anatomical Abnormality Inherited from the Fifteenth Century.—Congenital Hypertrophy.*

A MEETING of this section was held on Feb. 13th, Professor F. W. ANDREWS, the President, being in the chair.

Professor F. W. MOTT read a paper on the Changes in the Central Nervous System in Hypothyroidism. The nervous symptoms of myxedema, he said, pointed to a condition of exhaustion of nervous energy, which could be remedied by the administration of thyroid gland. Consequently, upon the assumption that the basophil substance of the nerve cell is a source of nervous energy, one would expect to find what he had actually found in seven cases—viz., a marked chromatolysis, which in sections of the brain and spinal cord was revealed by the partial or complete disappearance of the Nissl granules throughout the central nervous system. Six of the cases had already been recorded. The chromatolytic changes were universal, sparing no system or group of systems of neurones entirely, but had been especially noted in the smaller cells of the autonomic nuclei—e.g., the vagus and glosso-pharyngeal. The cells of the olfactory body showed much less change, and the Purkinje cells of the cerebellum less change than the large motor cells of the medulla oblongata, spinal cord, and Betz cells of the cortex, and there was no increase of neuroglia. All the asylum cases, especially four of the five, showed marked chromatolysis of the cortical cells; the one that manifested the least degree of mental confusion and other signs of insanity exhibited the least change in the cortical cells. The lantern slides of the seventh case, not hitherto described, showed very marked changes, and the mental symptoms were most pronounced. He had come to the conclusion that there was a type of insanity in women about the climacteric, in which a manic-depressive condition, associated with mental confusion, hallucinations, delusions (mainly of persecution), loss of memory of recent events, and terminating in dementia occurred, and which might arise as a result of a particular form of hypothyroidism. It was characterised by: 1. An atrophy of the glandular structure of the thyroid, interstitial fibrous hyperplasia, and abundant infiltration of the gland with lymphocytes—a condition of chronic inflammation arising from a toxic condition, probably local in its source, as Kojima had shown. The adjacent parathyroids did not exhibit this change. 2. An increase in weight of the pituitary gland as a rule. There was an increase of the pars intermedia, as had been demonstrated by Boyce and Beadles, and later by Herring, in experimental hypothyroidism. Herring had shown that the cells of this structure invaded the pars nervosa, and this had occurred in the case, the seventh, now being described. All five cases of hypothyroidism, in which the pituitary was examined, showed an excess of colloid in the pars intermedia. The characteristic perinuclear chromatolysis of the nerve cells found in these cases was not seen in two cases of simple atrophy of the thyroid gland. Examination of the thyroid in these two cases showed still normal colloid vesicles, and although there was an increase of fibrous tissue, there was no lymphocytic infiltration indicative of a local toxic inflammation, nor was there any increase of the pars intermedia or colloid material of the pituitary, observed by Kojima. It had, however, always to be considered how far the atrophy of a gland and failure of its function might act in upsetting the bio-chemical balance existing between the secretions of all the ductless glands and the sexual glands. In the five asylum cases, in which the suprarenal glands had been examined, a deficiency of lipid in the cortex was observed, but it would be unscientific to correlate this condition definitely with the thyroid atrophy, for the patients had died usually from some acute infective disease, and Elliot had shown that in deaths so occurring the lipid is diminished. Kojima, in his exhaustive examination of all the ductless glands in three cases, came to the conclusion that he could exclude the probability that changes in any ductless glands other than the thyroid could be responsible for the nervous and mental symptoms and the histological changes in the central nervous system. It was noted, however, that the

ovaries were affected in three cases, and these were those in which there was not merely a glandular atrophy, but also a marked chronic inflammatory interstitial change. In the new case there were extraordinarily large ovaries and an enormous number of corpora albicantia, but healthy Graafian follicles were present. The blood and cerebro-spinal fluid gave a negative Wassermann reaction in all the cases.

Dr. H. DRINKWATER recorded a peculiar Abnormality of the Fingers which had been transmitted through 14 generations. The thumb and index finger were normal. In the middle finger the terminal joint was free, but the proximal interphalangeal joint was only slightly movable. In the ring and little finger the first and second phalanges were quite continuous. The hands were symmetrically affected. All the toes, excepting the hallux, were affected like the ring and little fingers. The patient's father had married twice. One of the patient's half-brothers presented the same abnormality, as did also his father and paternal grandfather. The patient himself was a direct descendant in the male line from the first Earl of Shrewsbury (d. 1453), and when the body of that nobleman was exhumed in 1874 it had been discovered that the fingers exhibited a similar variation. The mode of the inheritance of the malformation among the recent members of the family showed it behaved as a Mendelian dominant. Dr. Drinkwater did not think that there was any genetic relationship between this condition and brachydactyly.

Dr. H. S. STANNUS communicated an account of a case of Congenital Hypertrophy of a Lower Limb, which occurred in a native of the New Langenburg district, German East Africa, a man about 17 years old. The right lower limb was larger than the left at birth, the disproportion being maintained during growth. The length, as measured from the anterior superior iliac spine to the tip of the external malleolus, was 101 cm., as compared with 84 cm. on the left side. Skiagrams showed that the bones participated in the enlargement.

#### MEDICO-PSYCHOLOGICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND.

##### Dreams and Their Interpretation.

THE ordinary quarterly meeting of the Association was held at the Medical Society's rooms, Chandos-street, Cavendish-square, W., on Feb. 15th, Lieutenant-Colonel DAVID G. THOMSON, the President, being in the chair.

The PRESIDENT made sympathetic reference to the decease of a number of members since the last meeting, including Dr. William Orange, C.B., of Broadmoor, and a former President of the Association. He then offered the Association's congratulations to Sir Robert Armstrong-Jones on the honour of knighthood which he had received, and to Dr. John Warnock, the distinguished worker in lunacy in Egypt, who had been awarded the distinction of the Order of St. Michael and St. George. He added that Captain D. H. Pennant, a former assistant medical officer at Barnwood House Asylum, Gloucester, had been awarded the D.S.O. and Dr. P. M. Turnbull, formerly of Tooting Bec Asylum, the Military Cross.

Sir ROBERT ARMSTRONG-JONES having briefly acknowledged the congratulations of the Association, which he greatly valued, read a paper entitled "Dreams and Their Interpretation, with Reference to Freudian." He said that it was claimed by many that the interpretation of dreams helped to bring out of the unconscious mind what is perplexing and hidden, and restored the balance in the unstable and in those suffering extensively from mental shock. Freudians, he added, considered a dream as the symbol of an unfulfilled wish, which had to be interpreted by an assumed psycho-analytic code, but in his view the dream did not always, as assumed by Freud, refer to sex matters. The fact that dreaming could be induced by such agents as opium, alcohol, and tobacco favoured the view that it was a morbid process. There was, he said, good reason for the belief that most dreams occurred just before waking, while the age of greatest dreaming was between 20 and 25, and women, who slept more lightly, dreamt more than men. He thought that the sexual theory of dream-causation was over-emphasised, the psycho-analyst always finding what he sought, while he considered that the foreign teachers responsible for employing the "sex-mad methods," and the craze for new excitement,

have in this country already received posthumous recognition of their labours, for, thanks largely to the efforts of Dr. Mercier, Freudism in this country was practically dead.

Sir GEORGE SAVAGE, as a persistent dreamer and therefore with a wide experience, spoke of the very short time occupied by an elaborate dream, which he had been able to prove on more than one occasion.

Mr. ROTHSAW STEWART had found, after some practice, that he could trace every dream he had to something which had occurred before.

Colonel J. W. SPRINGTHORPE spoke of the many cases of shell-shock with which he had had to deal, in which he did not doubt that in 99 per cent. the cause was fright. Freud, in his wholesale attribution of dreams to sex matters, had made an unutterable mistake which was practically an insult to humanity.

Dr. J. G. SOUTAR remarked that British alienists did not proceed to examine everything in the light of a pre-conceived idea. It would be easy to discover some connexion with sexual matters in everything; but it was needed that such ideas should not prevail in the mind of the investigator. Such an interpretation of dreams was contrary to experience. He had found that when insane patients began to have happy dreams, it augured well for recovery.

Dr. ALICE JOHNSON pointed out, in opposition to the Freudian idea, that the mind could be made by psycho-analysis more the reservoir of beautiful things, and such a mind would dream beautiful dreams.

Dr. HELEN BOYLE believed people, especially children, showed a strong tendency to bury unpleasant memories. In some cases the psycho-analyst succeeded in burying those memories deeper.

Dr. A. N. BOYCOTT spoke of the power of opium in causing dreams.

Dr. R. H. STEEN pointed out that Freud did not refer everything to sex impulse. Freud had shown a wonderful patience and labour, for he had analysed a thousand of his own dreams before putting pen to paper, and 50 of his followers had done the same thing, so there was a great mass of material to go upon. He would have liked to hear a reference to the Zürich school, which went beyond Freud, and held that dreams had a prospective as well as a regressive function. Maeder had written extensively on this.

Dr. MONRAD KROHN said he had never seen the eradication of the sex-complex do any patient any good, yet he could not look upon Freud's ideas with so much indignation as did some others. There had been, in his view, a great heaping-up of new terms, without corresponding enlightenment.

Sir ROBERT ARMSTRONG-JONES replied on the various points raised.

**ERRATUM.**—In the report last week of the debate which took place at the Medical Society of London on Naval Medicine in the Great War, the latter portion of the speech inadvertently attributed to Major Mott was made by Dr. Thomas Beaton.

#### JOURNALS AND MAGAZINES.

**Science Progress** for January.—This excellent quarterly contains articles of the first interest to medical men in several of the departments of special knowledge with which medicine is now seen to be intimately concerned. Dr. Mercier continues a valuable analysis of the facts which form the answer to the old and difficult question—What is a disease? Dr. R. A. Houston, lecturer on physical optics in the University of Glasgow, gives an unmathematical account of a theory of colour vision which has already been described in the Proceedings of the Royal Society, and although the paper is necessarily highly technical, others besides specialists will be able to follow its arguments. Mr. W. P. Pycraft, of the Zoological Department of the British Museum, replies with force to the speculations of Mr. G. S. Miller, of the Smithsonian Institute at Washington, upon the jaw of the Piltdown man, the nature of his criticisms being dictated by the unfortunate fact that Mr. Miller appears not to have seen the remains concerning which he states that the cranial portions are unequivocally human, while the lower jaw is that of a chimpanzee. Mr. Pycraft's whole-hearted desire to demolish Mr. Miller's contentions has received the endorsement of Dr. Smith Woodward, Professor Elliot Smith, Professor Arthur Keith, Professor A. S. Underwood, and Dr. Broom. Useful notes on the recent advances in science are made by a well-qualified group of writers, and the editor, Sir Ronald Ross, contributes an essay-review, entitled "The Sister of

Science," founded on a recent book of verse by Mr. John Masefield and the "Book of Homage to Shakespeare," edited by Dr. Israel Gollancz. The title of the essay-review displays the writer's well-known love of poetry; its contents show that, having given proof of his personal abilities in the field of poetry, he is also a sympathetic critic.

The *Cornhill* for February contains a very interesting note on the sensations of being gassed recorded by Mr. Lewis R. Freeman in an article entitled "Beating Back from Germany." Mr. Freeman, an escaped prisoner from Germany, was among the first victims of the use of gas in war, when no precautions were taken and when the treatment was also still to find.

"My first sensation," he says, "was of a smarting way up inside of my nose. This quickly extended to my throat, and then, as my lungs suddenly seemed filled with red-hot needles, I was seized with a spasm of coughing. Coughing up red-hot needles is not exactly a pleasant operation, and the pain was intense. Mercifully, it was only a few minutes before a sort of stupor seemed to come on, but even as I passed into half-consciousness I was aware of my outraged lungs revolting, in heaves that shook my frame, against the poison that had swamped the trench. With some of my comrades the fighting instinct was the last thing that died, and I have a sort of a recollection of two or three of them clutching at the parapet and firing from cough-shaken shoulders off into the depths of the rolling yellow gas clouds. One lad toppled over beside me and still kept pumping shots from the bottom of the trench. I remember hazily trying to kick his rifle out of his hand as he discharged it over my ear, and, failing to locate it with my foot, recall groping instinctively for my old wrench and trying to disarm him with that. My last recollection of this stage of things was the shock of feeling the wrench-handle swing backwards harmlessly for lack of my two shrapnel-smashed fingers to steady it. I had rolled and writhed, in the agony and pain of the gas in my lungs, in a pool of slush in the bottom of the trench, and it must have been the lying with my face buried in the shoulder of my wet woollen tunic that saved my life."

After describing his recollections of the occupation of the trench by the Germans, he continues:—

My connected recollections begin after my waking up in a hospital—well back from the Front, but still not out of the sound of the guns—that was evidently devoted entirely to "gas" cases. The ward I was in was filled with men from my own regiment, but what interested me specially—as soon as I was able to take any interest in anything beyond my own suffering—was to observe that a great many Germans were also being treated in the same hospital. I never did find out just how these happened to be "gassed," but presume it was either through accidents to their apparatus or from their "snoots" being faulty. At any rate, the Germans had evidently prepared in advance for "gas" cases, and the chances are that they pulled through a good many of us who might have died had we been taken back to our own hospitals, where they had, at that time, small facilities for handling that kind of trouble. The ward was kept as hot as a Turkish bath, and some of our chaps thought this was done with the idea of making our agony worse. One of them, who jumped out of bed, threw up a window, got a lungful of cold air, and died the same night, gave us a proper object-lesson in why the air had to be kept at close to blood heat. Some of them also thought that a kind of stuff they gave us to inhale made us worse rather than better, but that was only their imagination. If there was any real ground for complaint it might have been on the score that the doctors tried a good many experiments on us, because this was the first chance they had had to study gas poisoning on a large scale, but that was no more than we could have expected.

The *Burlington Magazine* for February.—This admirable monthly magazine is publishing a series of notes on dress as described in Shakespeare, which have considerable medical interest, though nothing, probably, was further from the mind of the writer. The medical conclusion will be that our modern attire, although constantly ridiculed as dull and meaningless in detail, and unhygienic in design, is a far more healthy method of dressing than that in use by the Elizabethans. The rich habits of the sixteenth century, save in the case of persons endowed with money and prominent in position, were not hastily discarded. Elizabethan suits, cloaks, breeches, and jerkins went on not only from year to year, but from father to son, and must have been veritable germ-traps by the time that they reached the valet or were cut up to adorn more modest clothes. For even where a garment was not handed on in this way as a whole, its various trimmings of lace, braid, or fur were made to adorn newer garments in a manner which modern thrift or modern ideas of cleanliness would not condone.

# THE LANCET.

LONDON: SATURDAY, FEBRUARY 24, 1917.

## Food Problems.

THE U-boats and Lord DEVONPORT have produced among thinking people in this country a concentration on food problems in much the same way as the publication of the Eltzbacher report did in Germany two years ago. Of this report we were able to publish an extensive summary in THE LANCET of Feb. 20th, 1915. Up to now the average well-bred person in this country has been slightly overfed, and in consequence—a point distinctly in favour of slight overfeeding—has thought little about food, any preoccupation with the subject being left to the glutton and the really hungry. The report drawn up by the Committee of the Royal Society bears comparison with the German figures and shakes many of our preconceived notions. It is surprising to learn that the available food per man before the war occurred was considerably larger in this country than in Germany—4009 large calories in England compared with 3642 in Germany. The idea was certainly prevalent that the German ate more than the Englishman, and this may, of course, have been true or merely an impression gained from a difference in table manners. But, if true, it is, at all events, nearly certain that we had more food at disposal, and if we did not eat it we must have thrown it away. There is, as the Royal Society report points out, a small unknown factor in that the English calories are calculated on the total amount of available foodstuff, whereas the German figure takes into account the deduction for food which is eaten but not utilised in the bodily economy. If this deduction amounted, as appears, to about 11 per cent. the figures for the two countries become more nearly equal. There are, of course, various ways of throwing away food. It may be destroyed or spoiled before it reaches the consumer, squandered by careless housekeeping or improper culinary methods, wasted by complete ignorance of the methods of carving, or left on the plate; and doubtless all these ways are physiologically more righteous than burdening the digestive and excretory organs, yet some or all, with varying intensity, are still playing their part in many homes.

Starting, then, as we may, from 4000 calories as about the normal adult allowance of food in each country, we note that in 1916 the British soldier on active service abroad is apportioned 4644 calories, at home a sixth less, or 4031 calories, in each case including extras, leaving an estimated 3859 calories available for the civilian. The Eltzbacher Commission calculated that 3151 calories per head would be available in Germany in 1916 if certain measures of increased production and economy were carried out. The actual physiological requirement of the

adult has been placed in the neighbourhood of 3000 calories by German authorities and of 3500 calories, for a man on fairly light munition work, by Dr. LEONARD HILL. But we really do not yet know by experiment on any large scale the food requirement of a large mixed body of persons in order to maintain health, and even the chairman of the Royal Society's Committee in investigating last week his own unrestricted diet as a brain-worker was surprised to find the result work out so low. A slight clue to the calorie value now considered necessary in Germany may perhaps be gained from KÖHLER's recent suggestion to issue cards entitling the possessor to buy food up to 2500 calories per head per day, with some extras for a man engaged in severe manual work. For the sake of the revenue KÖHLER would allow the purchase of more calories than this, at the price of a rapidly ascending increment tax. For the rest a careful study of German medical literature fails to convey any certain impression that the food restriction has so far worked harmfully on the adult. Medical Munich, in fact, allows itself the playful suggestion that the restriction has not been without advantage to the slightly over-nourished Berlinite.

When we turn to the quality of foodstuffs we find that war conditions are giving the man in the street some much-needed insight into the distinction between economical and expensive foods. The Royal Society's Committee brings out the relative cheapness of dairy products over beef and mutton, especially over the former. The report states that 1000 calories in the form of milk from a good cow presuppose only 3 lb. of starch or its equivalent in the fodder supplied, whereas the same number of calories of steer beef are the product of 9 lb. of fodder. Similarly, a substitution of cheese for butter would give an average of 4·2 grammes more protein per man throughout the whole country. In agricultural countries dairy products, pig-meat, and veal are the natural food of the people, and we now realise that economy, as much as homely taste, may dictate the preference for these meats. That a whole nation may rapidly change its diet-sheet is evident from the fact that Germany ceased at the onset of war to export its million tons of beet sugar and consumed them at home to compensate for the loss of imported fats. The Eltzbacher Commission pointed at the time to England, and a fortiori America, as countries in which a high consumption per head of sugar was unattended by ill-result. The non-necessity of a large proportion of meat in the dietary was strongly emphasised by the Commission, and in Charlottenburg any citizen may now exchange his full meat-card of 250 grammes for 375 grammes of macaroni, semolina, or oatmeal, or a child may exchange his meat-card of 125 grammes for 200 grammes of cereals. RUNGE has just noted the greatly diminished incidence of eclampsia among pregnant women in Berlin, and puts this down to the larger proportion of fat and carbohydrate and the smaller proportion of protein in their daily food.

The distribution of the total food among the various age-groups of our population affords fruitful material for useful discussion. The Royal Society's

Committee and the Eltzbacher Commission agreed in allotting to the young child two-fifths, to the child of 6 to 9 one-half, and to the lad or girl of 14 or 15 three-quarters of the man's ration, assessing the adult woman at four-fifths. For the soldier in the trenches, being a man in the prime of life, with well-conditioned muscles and arteries, exposed to cold, fatigue, and prolonged bouts of severe exertion, it is probably difficult for any amount of overfeeding to be actually harmful. Sir ALFRED KEOGH called attention last week to the value of this relative excess of food in the prevention of infections under conditions of war. Overfeeding, too, in phthisis, has been credited with a certain value, and there have been painful reports in circulation of the incidence of tuberculosis among the now chronically underfed children in Belgium. But an Army food ration of 4500 calories, associated with some rum and much tobacco, would infallibly have most harmful effects on a pure brain worker, as well as on the older man whose excretory powers are diminishing and whose arteries are hardening. And after the age of 45 there is no reason to suppose that an excessive ration of food protects the civilian at all events against infections, and much reason to know that it shortens his life from gout and arterial degeneration. HERMANN SAHLI indeed tells his students year by year that they have a certain amount of food which they can consume in the course of their lives, and that they can do so as they please, whether slowly or quickly, living in the one case to a great age, and in the other dying early as a result of high arterial tension. Commissions in Australia and America have recently<sup>1</sup> called attention to these dangers. In the woman after the climacteric there is a tendency either to become stout or thin, and little doubt can be felt that the latter tends toward comfort and longevity. The food limitation in Germany has, however, led to much anxiety in regard to the children, and the results of a few investigations bearing on the subject have been published. SCHLESINGER has just reported on 1300 school children in Strassburg, of ages from 6 to 14, weighed at the beginning and end of the third quarter of 1916. Normally during this school quarter 75 per cent. of the children lose weight, but last year 90 per cent. of them did so, including those from well-to-do families. Loss of fat was evident, but in spite of this not more than the usual proportion of anaemia was noted, and no evidence of the listlessness and inertia of malnutrition. The author's recommendation was, nevertheless, to increase the bread ration for children of 14 to 17 and to give a morning glass of milk to those of 6 to 10. H. FINKELSTEIN admits the feeding of the young child in poor Berlin families to be a matter of grave difficulty, incidentally mentioning that the poor mother's midday meal consists now usually of potatoes and swedes, while the daily ration of sugar is at present 25 grammes and of potatoes 360 grammes.

The net conclusion to which it is possible to come from the various conditions set out above is as

follows. In any community with an available food-supply of anything like 3500 calories it should be possible so to apportion it among the various age-groups that neither the young child and nursing mother nor the active young adult suffers. Outside these groups a greater limitation of intake may be tolerable or even beneficial.

### War Injuries and Neuroses of the Ear.

IN addition to direct trauma of the hearing organ and to the damage produced upon it by long-continued exposure to loud noises, the present war has made us acquainted with new varieties of deafness as a result of the tremendous shocks to which the delicate nerve structures of the cochlea and brain are so frequently exposed. The most distressing of these nerve injuries are seen in soldiers who have been buried by explosions, an experience which, apart from any obvious bodily injury, frequently brings about a complete functional disorganisation of the whole nervous system. In the worst cases death is the result. But, short of that, the man may be reduced to a state of imbecility, with vertigo, blindness, deafness, and loss of speech. This condition of general sense-paralysis is, however, only transitory. In the course of a few hours the patient recovers control of his faculties, and has little to show for his terrible experience save a painful and obstinate "loss of nerve." In many instances, however, we must add, one or other of the special senses or faculties remains out of gear for several weeks or months. And one of the senses thus afflicted is frequently that of hearing.

At a special discussion on "War Injuries and Neuroses of Otological Interest," held at the Otological Section of the Royal Society of Medicine on Feb. 16th, these points were fully brought out by the speakers, all of whom had had special experience of these particular types of warfare injury. As we might expect, the differentiation between the functional or temporary upset and the organic or permanent lesion is of great importance, and sometimes of considerable difficulty. For this distinction many speakers laid stress upon the general aspect of the patient as affording a clue to the real nature of the deafness. Another point of value is that the functional or "psychic" deafness is bilateral and, at first, absolute, while deafness from a permanent lesion is asymmetrical and incomplete. The latter type has become familiar to the otologist nowadays as a sequel to a superficial bullet wound of the skull in the neighbourhood of one or other ear. But a shell explosion may also, of course, produce a labyrinth lesion which leads to permanent deafness and that without any evident traumatism. A third method of differentiation consists in the use of the vestibular tests which in functional deafness give a normal or exaggerated response, while in organic perceptive deafness the vestibular reflexes are more or less impaired. At the outset, the participation of the vestibular system in the general disturbance is evident in the presence of vertigo and spontaneous nystagmus

<sup>1</sup> A Campaign against Adult Mortality, THE LANCET, 1916, II., 683.

immediately after the explosion. But, as in other sudden interferences with the entire labyrinth, the vestibular system recovers early, so that by the time the patient reaches the base hospital his acute vestibular phenomena have usually subsided. The prognosis in functional deafness is good even when it is absolute; recovery, and sometimes sudden recovery, is to be expected. The latter event may be brought about by judicious "shock" treatment, such as is brought about by running cold water into the external meatus, or by applying the caloric test, a method of treating hysterical deafness which was introduced some years before the war. The shock treatment by faradism, it should be noted, is harmful and should be avoided. When the deafness persists the treatment adopted is, first and foremost, the building up of the patient's bodily and mental strength by good food, fresh air, bright society, and, above all, peaceful surroundings. If, in spite of these favourable conditions, the deafness continues, then the most reliable method of restoring function is by some method of re-educating the hearing. This may be done, first of all, by the careful and persistent application of vibrating tuning-forks to the mastoid so as to arouse the sleeping sense through the medium of bone-conduction. Later on recourse may be had to resonators. Several curious facts emerged in the course of the discussion, which was well maintained, one being that when the tympanic membrane is ruptured by the shell-burst the labyrinth manifests no evidence of damage. This experience is in correspondence with the fact that shell-shock in general is rarely associated with actual external wounds. But it is certainly remarkable that the rupture of a small structure like the tympanic membrane should be sufficient to divert the weighty blow from the more important cochlea. Doubtless the cause of this phenomenon lies in the fact that the energy of the explosion-wave in the act of destroying the integrity of the membrane is thereby dissipated in a series of deviations from the normal path. And so the delicate internal ear escapes the injury.

Mr. H. J. MARRIAGE, the President of the Section, in his introductory paper advocated for the protection of the hearing the use of an obturator in the external auditory meatus of the soldier exposed to a bombardment. And the same, of course, applies to the sailor. But he warns us that the obturator should be made of plasticine or some such material, and *never of celluloid*, as several men have had their ears damaged by the flash of a shell igniting plugs made of that inflammable substance.

AN Order has been issued by the Local Government Board authorising medical officers of health to vaccinate or revaccinate small-pox contacts gratis where the circumstances demand it.

A READING of the poems of Sir Ronald Ross will be given on March 23rd, when the vocal interpretation will be undertaken by Miss Miriam Lewes and Mr. William Stack. Sir William Lever has placed his Hampstead house at the disposal of the Poetry Society for the occasion, and non-members of that society may obtain further details from the secretary at 16, Featherstone-buildings, W.C.

## Annotations.

"*Ne quid nimis.*"

### CRIMINAL LAW AMENDMENT.

THE new Criminal Law Amendment Bill introduced in the House of Commons by the Home Secretary contains very important provisions not only relating to the communication of venereal disease, although these constitute the most novel feature of the proposed legislation. By Clause 2 of the Bill it is made penal for a person suffering from venereal disease in a communicable form to have sexual intercourse with any other person, or to solicit or invite any other person to have such sexual intercourse, the maximum penalty provided being two years' imprisonment with hard labour. It will, however, be a defence if the person charged proves that he or she had reasonable grounds to believe that he or she was free from venereal disease when the alleged offence was committed. Power is given to the court to order the medical examination of the person charged in certain circumstances, and the examination thus ordered shall, in the case of a female, if she desires it, be conducted by a female doctor. It is further provided that—

Where a person has within three months before the commission of any alleged offence under this section received a written notice either on an examination ordered under this section, or while under compulsory detention in any prison or other institution, from a duly qualified medical practitioner that he or she is suffering from venereal disease in a communicable form, that person shall be deemed to have been so suffering at the time when the alleged offence was committed, unless the contrary is proved.

As the fact that any person was at a given time suffering from venereal disease in a communicable form must in most instances be only provable by medical evidence, the importance of the proposed law to the medical profession is obvious. Further, a question in this connexion may well suggest itself as to how far pressure is likely to be brought upon medical practitioners to give evidence against their patients in order to obtain their conviction, and the insertion of words protecting them against the possibility of such pressure is desirable. The conferring of privilege upon any communication, made by a medical man on the subject of infection in the public interest, is a further useful addition to the Bill. The Bill also makes very important alterations in the law relating to indecent advertisements. These, it will be remembered, have hitherto been dealt with under an Act passed in 1889 which provided penalties for classes of advertisements the prevention of which is badly wanted, but only when they appear in public places. Under the Bill, which, no doubt, the Government will have no difficulty in passing, any "person who publishes by way of advertisement or causes to be so published any picture or printed or written matter which is of an indecent or obscene nature" will be guilty of an offence, and not only any advertisement relating to venereal disease and cognate matters is declared to be indecent, but also any which suggests "directly or indirectly the use or taking of any appliance, drug, substance, or thing for the purpose of procuring miscarriage or abortion, or which suggests directly or indirectly that any premises are or can be used for immoral purposes." Advertisements in bona fide medical and pharmaceutical publications

are made exceptions to the above. The general prohibition of the advertisements of quacks and nostrum vendors who, by their obvious admissions, are abortionists is a matter in which THE LANCET has interested itself for many years. Such advertisements have recently been confined to a few disreputable publications, some of which seem to have disappeared since the war began. They were wont to make flaunting appearance in all sorts of prints—especially in newspapers published on Sunday and in religious papers. In any case, the proposed Act of Parliament will deal a vital blow to those advertisers of the sort who survive and to the iniquitous trade which they have fostered and assisted. The Criminal Law Amendment Bill further proposes to render more stringent the provisions of the law relating to sexual intercourse and acts of indecency in the case of girls under 16 years of age, and to the keeping of brothels.

#### SPECIFICITY IN ANTISEPTICS.

THAT the power of an antiseptic to kill organisms is not the same for all organisms has been recognised in bacteriological practice for a long time, and Dr. Kenneth Taylor's special study in regard to the antiseptic treatment of chronic infected wounds, exhibiting, as they do, several types of bacteria, deserves careful reading. He records a large number of bacteriological examinations of wounds under treatment with different solutions, and instances are brought forward of the specific action of certain dressing solutions. The belief is expressed that further analytical study of antiseptics will result in the discovery of dressings specific for one or more groups of bacteria. By a successive application of these dressings the organisms present in a wound, he holds, may be reduced in number or eliminated, one variety at a time, and true sterilisation of a suppurating wound accomplished. The concept of the "general antiseptic," he concludes, must go by the board and the search for a cure-all be recognised as unprofitable. One interesting case is that of the gas bacillus, on which no effect seems to have been produced by any of the dressing solutions with the exception of quinine, where the early disappearance of the organism was strikingly apparent, a result which is consistent with earlier experience of the behaviour of this alkaloid both *in vitro* and in clinical application.<sup>1</sup> Quinine, however, showed very little action upon the staphylococcus and still less upon the *B. pyocyanus*. Further examples of equal interest of the specificity of antiseptics are given with other germicidal preparations. Thus, carbolic and cresol proved more active against the streptococcus than against the staphylococcus, and showed very little activity against the gas bacillus. Thymol showed a fair degree of activity against the streptococcus, but was less active against the staphylococcus and still less so against the gas bacillus, while it showed practically no action upon *pyocyanus*. Dakin's solution, which has been regarded as a general antiseptic, showed a moderate activity against the staphylococcus, but was nearly inert against the *B. pyocyanus* and the gas bacillus, although more active against the streptococcus. The results are certainly full of interest and importance and seem plainly to point out the great variation in the activity of some of the "general antiseptics" toward the common bacteria of infected wounds.

so that the conclusion that bactericidal values are relatively specific and not general seems abundantly justified. Touching somewhat upon the same subject, a paper on "A Comparison of Some Antiseptics in Respect to their Diffusibility, Action of Leucocytes, and Action on Ferment Activity," by Hugh E. Magee, B.Sc., appears in the February number of the *Edinburgh Medical Journal*, in which the author expresses his acknowledgment to Dr. Kenneth Taylor for his help in the prosecution of this research. In order to demonstrate wherein antiseptic solutions differ from each other, a comparative study was made of some of the common bactericidal agents in regard to diffusibility, chemiotactic action, and action on ferment activity. These properties are shared in different degrees by various germicidal solutions as is clearly shown in the paper, and the results are instructive in connexion with the treatment of wound infection. A number of antiseptics were chosen for the investigation and their values in the directions indicated deduced. The specificity of the antiseptics tested bears a relationship to the properties investigated.

#### THE STATISTICS OF INFANTILE MORTALITY.

TUESDAY'S lecture at the Royal Statistical Society on "The Relation of Infantile Mortality to Mortality in Subsequent Life" was delivered by Dr. John Brownlee, director of statistics to the Medical Research Committee, and will serve as a useful tonic to all those who have to deal with the statistics of infantile mortality. He began by describing the three points of view taken in regard to the attempt to save infant life by means of administrative action. The first group holds strongly that every child's life saved adds another potentially fit member to the working power of the State. The second is an opposing group which holds equally strongly that measures such as those taken to save infantile life can only lead to an increase in the number of unfit persons for whom the nation has ultimately to provide. The third group, in which the lecturer found the medical officers of health strongly represented, regards the unfitness which develops after infancy as largely due to the environmental conditions in which the child grows up. Dr. Brownlee then examined the statistical evidence on which these points of view were based, and found reason to doubt every method proposed to measure the influence of the death-rate as a selective agent. A large number of deaths among children are due to epidemics, and so long as our knowledge of the epidemiology of disease remains as limited as it now is no estimate of selective influence can, he said, be of the least value. This agnostic attitude does not prevent Dr. Brownlee being personally of the opinion that an improved environment is the most important measure for the maintenance of a healthy race, and that no effort can be too great to accomplish this improvement.

#### FERNS AS A SOURCE OF STARCH.

Professor A. E. Shipley's suggestion in a letter in the *Times* of Feb. 19th that the underground stems of the common bracken fern or brake might profitably be used as a source of starch deserves attention. The common bracken fern is abundant enough throughout the country, but, of course, one serious difficulty would be its economic collection. The underground stem, says Professor Shipley, is

<sup>1</sup> Use of Quinine in the Treatment of Experimental Gaseous Gangrene, THE LANCET, Sept. 4th, 1915, p. 538; and the Use of Quinine Hydrochloride Solution as a Dressing for Infected Wounds, Brit. Med. Jour., Dec. 25th, 1915.

packed with starch, and is simply there asking to be taken. It would be interesting to find out the actual percentage of starch which the rhizome contains, but in the references which we have been able to make there is no information upon this point. According to Dr. W. T. Fernie in his book on "Herbal Simples," the bracken contains much potash, and its ashes were at one time employed as the alkali for making soap. The young tops of the plant, he goes on to say, are boiled in Hampshire for hog's food, and the peculiar flavour of Hampshire bacon has been attributed to this custom. It would appear from this authority also that the root affords much starch, and in northern climates a coarse kind of bread is made from the roots of the brake fern, whilst in the south the young shoots are often sold in bundles as a salad. All this confirms Professor Shipley's observations. In an article on "Ferns" in "The National Standard Dispensatory" it is stated that "in the East Indies and Polynesia the rhizomes of a number of ferns are eaten as starchy foods, or the starch is extracted from them." Experiments might be begun to ascertain the most economical method of separating the starch from the rhizome, and then some idea will be gained as to whether the yield of farina is profitable. At any rate, the starch so obtained might be used in certain industrial processes in which starch from cereals is used, and the latter so saved for food purposes.

#### THE PREVALENCE OF INTESTINAL PROTOZOA.

A SURVEY of the special report recently issued by the Medical Research Committee on "Amœbic Dysentery and the Protozoological Investigation of Cases and Carriers" contributed by Mr. Clifford Dobell will bring to the medical world the knowledge of the great prevalence of amœbic dysentery carriers amongst our forces, a prevalence which is borne out for the Salonika area by the paper of Lieutenant W. Roche, R.A.M.C., which appears in another column. Mr. Dobell's first conclusion, which he has formed as a result of his investigations, is as follows: That negative findings of *Entamœba histolytica* cysts in examinations of the faeces, even when carried out by competent examiners, cannot always be relied on to prove that the patient is not a carrier of the disease. He deduces from detailed observations that all cases that have not been treated should have at least six different examinations of the stools before being declared negative. Cases undergoing treatment should not be declared negative on examinations made during this time, as a negative phase is then very prevalent, but they should be examined at intervals during the three weeks following the completion of treatment. The second conclusion formed by Mr. Dobell is that emetine bismuthous iodide, properly administered in full doses, frees carriers from *Entamœba histolytica* cysts, whilst treatment with emetine hydrochloride has not been found successful. Emetine bismuthous iodide is a new drug introduced by Dr. H. H. Dale.<sup>1</sup> The earlier forms prescribed caused considerable nausea and vomiting, but in more recent preparations this defect seems to have been greatly lessened if not overcome. Mr. Dobell deals also in the report with the intestinal flagellate protozoa. He does not see any reason to consider them pathogenic, and thinks they generally occur as

part of a diarrhoea and are not the cause of one. This is the general opinion amongst the greater number of French and English workers. No one has yet found any remedy which completely eliminates these parasites from the infected intestine.

#### OPHTHALMIA NEONATORUM.

THE second annual report just presented by the Central Council for District Nursing in London to the annual meeting deals chiefly with the subject of ophthalmia neonatorum. 806 cases were notified in 1915 to the London County Council, being 60 more than the average for the last few years, and several constituent nursing associations have recently reported an increase in the number of cases seen by them. The Council considers that much of the difficulty in dealing successfully with the condition arises from the fact that, at the time when the disease usually appears, both mother and infant require skilled care and treatment. Two main alternative lines of procedure are open for adoption: (1) The removal of both mother and babe in an ambulance to undergo appropriate treatment in hospital or infirmary; (2) adequate supervision and treatment at home. The Council discusses these two alternatives without definitely pronouncing its own preference in the matter. While recommending, on the one hand, to King Edward's Hospital Fund the provision of greater facilities for in-patient treatment, it lays stress also on the need for some training in ophthalmic nursing on the part of district nurses, and petitions the Local Government Board to give grants to nursing associations for service rendered in cases of ophthalmia. The in-patient treatment of these cases has, we believe, long been attended with excellent results at the St. Paul's Eye Hospital in Liverpool, and probably both alternatives may have their place in any well-ordered scheme for the metropolis.

#### THE USE OF ANTIMONY.

FEW drugs have a record of a more varied reputation than antimony, ranging from the extravagant praises of Basil Valentine 300 years ago to the comparative neglect of more recent times. The history of its use was lately traced in a paper read before the Hunterian Society.<sup>1</sup> A favourite remedy for many diseases in the seventeenth and eighteenth centuries, it was later adopted in the place of blood-letting for pneumonia and inflammations generally. This became the orthodox treatment for 50 years. Rousseau, whose lectures were published in 1861, was probably the last great champion of antimony in pneumonia. By that time it had been discovered that inflammations recovered better without either antimony or venesection. The doctrine, however, survives in some medical minds. The recent revival of the use of antimony is one of the triumphs of rational therapeutics, for it was through reasoning from its chemical affinities that Professor Cushny and Mr. Plimmer were led to try the remedy in diseases dependent on protozoal parasites. The control of trypanosomiasis by antimony and arsenic, given together or in alternation, is as striking in its way as the cure of malaria by quinine. The respective values of the two metals and the best method of administration have yet to be fully worked out. At present the drugs are

<sup>1</sup> THE LANCET, 1916, II., 183.

<sup>1</sup> THE LANCET, 1916, II., 1104.

often given intravenously at the beginning of the treatment, and later intramuscularly or by the mouth for a period of two years or more. Owing to the irritant and depressing qualities of many of the salts of antimony it is very necessary to use the metal in a form most easily tolerated. Several efforts have therefore been put forth to obtain a colloidal solution. The method of preparation of a stable solution of this nature was recently described in our columns by Dr. U. N. Brahmachari, of the Campbell Medical School, Calcutta.<sup>2</sup> The effects of antimony in sleeping sickness and kala-azar have led to its trial, with apparently good results, in the allied spirochaetal diseases syphilis and yaws—in the first of these in the form of antiluetin.<sup>3</sup> Here the old reputation of Plummer's pill, containing antimony sulphide, given as a so-called alterative, may be recalled. Some of the cases in which it seemed to do good may well have been those of chronic spirochaetal infection. The value of tartar emetic in some skin affections, as shown by Crocker and Willmott Evans, may have a like explanation. It may be noted that antimony is a constituent of many natural arsenical waters, especially those of Bagnères de Bigorre and Dax in the Pyrenean district.

WE regret to record the death last Saturday of Dr. Louisa Woodcock, physician to the Endell-street Military Hospital and out-patient physician to the New Hospital for Women.

NEXT week, at the Royal College of Surgeons of England, Dr. Wilfred Harris is to deliver two Arris and Gale lectures on "The Morphology of the Brachial Plexus in its Relation to Surgery" (Monday, Feb. 26th, and Wednesday, Feb. 28th, at 5 P.M.), and in the following week Professor A. E. Webb-Johnson will give a Hunterian lecture on "The Surgical Complications of Typhoid and Paratyphoid Fevers" (Monday, March 5th, at 5 P.M.).

OUR list of New Year Honours published last week should have included the name of Mr. Charles Lane Sansom, Principal Medical Officer, Federated Malay States, who has been made a C.M.G. In a supplementary list is the name of Professor J. C. Bose, C.S.I., C.I.E., who has received a Knighthood. His investigations into the electrical response of muscular and plant tissues are well known, as are also his studies in regard to the action of drugs on plants. An abstract of a lecture by Professor Bose on this latter subject was published in our issue of Nov. 7th, 1914, p. 1105.

<sup>2</sup> THE LANCET, 1916, II., 728.

<sup>3</sup> Suzuki: Deutsche med. Wochenschrift, 1913, p. 985.

## THE LANCET, VOL. II., 1916: THE INDEX.

OWING to the continued shortage in the paper-supply the Index and Title-page to the volume of THE LANCET which was completed with the issue of Dec. 30th, 1916, have been printed separately, and copies have been supplied gratis to those subscribers who have intimated to us their wish to receive them. Other subscribers will be similarly supplied, so long as the stock remains unexhausted, on application to the Manager, THE LANCET Office, 423, Strand, London, W.C. Such applications should be sent in at once.

## THE CONTROL OF VENEREAL DISEASES.

### Early Preventive Treatment.

A CORRESPONDENT has supplied us with these notes on the history of early preventive treatment of venereal disease.

The first experiments seem to have been made by Metchnikoff, who reached the conclusion that an ointment containing not less than 25 per cent. of calomel applied a few hours after exposure to syphilitic infection stopped the development of the disease. An ointment of lesser strength than 25 per cent. of calomel proved ineffectual. The ointment he found best contained 33 parts of calomel, 67 parts of lanoline, and 10 parts of vaseline, and this, with slight modifications, seems to have been employed by all who have subsequently attempted early preventive treatment. For the prevention of gonorrhœa urethral injections of various antiseptics have also been tried, of which 2 per cent. protargol has received the most favour. In 1904 preventive treatment was instituted in the Austrian Army, in 1907 in the French Army, and in other continental armées at about the same time. In the Navy and Army of the United States the method began to be used about 1909, and in the *Military Surgeon* of that year is an account of the issue to soldiers in a dépôt in the Philippines of a "prophylactic kit," but no definite figures are given to show the results. Several sets of figures are, however, available to show the success of preventive treatment at various naval and military stations in the United States.

At Jefferson Barracks, Missouri, a military recruiting dépôt, compulsory preventive treatment was instituted in August, 1911. It was tried first in one company and proved so far superior to voluntary measures that it was extended in September, 1911, to the entire command. On Jan. 1st, 1912, the dépôt commander issued a memorandum to the troops on the subject of venereal diseases and their prevention. "Experience has shown," he says in the course of this memorandum, "that 95 per cent. of cases of venereal disease are preventable if treatment is given a few hours after sexual intercourse." Then follow orders, among them this:—

All enlisted men of the command who expose themselves to the danger of contracting venereal disease ..... will immediately upon return to the Post ..... report at the hospital for preventive treatment. Enlisted men absent from the Post on pass will upon their return and before turning in their passes endorse on the back thereof over their initials whether or not they were exposed to venereal infection during their absence from quarters.

Penalties were attached for non-compliance with these orders.

The results in this dépôt are stated as follows: In 1910 the admission rate for venereal disease was 313 per 1000. At this time no inspections were made to discover concealed cases and it is therefore probable that the full number of cases which occurred would give a higher figure. In July, 1911, monthly venereal inspections were begun, so that from this date onwards the admission rate represents the total number of cases, and would almost certainly be higher than hitherto, were preventive treatment ineffective. In September preventive treatment was made compulsory. The admission rate for the whole of 1911 was 250 per 1000, showing a fall of 20 per cent. since 1910. The rate for the last four months alone was 166—scarcely more than half that for 1910, and of these last cases more than 50 per cent. had contracted the disease before enlistment.

The figures for the first six months after prophylaxis was instituted are as follows:—

September, 1911, to February, 1912.

Total venereal admissions.	Old cases (contracted before enlistment, before arrival, or recurrences)	New cases (total).	New cases who had reported for prophylaxis.	New cases who had not reported for prophylaxis	Total prophylactic treatments given.
117	74	43	15	28	1675

Thus of 1675 individual preventive treatments only 15, or 0·84 per cent., proved ineffective.

Similar results are recorded from Fort Washington by Captain Mahlon Ashford of the U.S. Army Medical Corps. He tabulates the results of five months' compulsory prophylaxis as follows.

The number of hours elapsing between exposure to infection and prophylactic treatment as recorded in Column 3 rests necessarily on the soldiers' own statements, and is almost certainly in some cases an under-statement. As this interval is

Month.	Number of prophylactic treatments.	Number of infections after treatment.	Number of hours between exposure and treatment.	Percentage of infections.
Dec., 1913	40	1	5·3	2·5
Jan., 1914	34	3	5·6	5·5
Feb., ..	40	1	5·1	2·5
March, ..	57	0	6·4	0·0
April, ..	50	1	3·8	2·0
5 months' total... }	221	6	Avg. 5·2	Avg. 2·7

of first-rate importance an element of fallacy is present in these statistics. But it is a fallacy which, if corrected, could only make them more convincing, and the results as they stand are good. Of 221 men applying for treatment only 6 developed disease—4 cases of gonorrhœa, 2 of syphilis. Good results are also recorded from the U.S.A. naval hospital at Cavite. Here before prophylaxis was instituted venereal disease accounted for 25–30 per cent. of all admissions. After its institution cases of gonorrhœa fell from a 20–25 per cent. average down to 8 per cent., including in one year 30 cases not protected. Chancroid fell similarly from 2–3 per cent. down to 2 per cent., including 10 cases not protected. Syphilis fell from 20 cases a year down to 1 case, not protected.

All the results so far mentioned appear so good that it is surprising to find the statistics for the whole U.S. Navy unfavourable rather than favourable. These figures, taken from the reports of the Surgeon-General of the U.S. Navy, and covering a total period of 12 years, are set forth by Surgeon R. C. Holcomb, U.S. Navy, as demonstrating that the system has proved a failure. Two periods of six years are considered, one from 1903–08, before prophylaxis was instituted, and one from 1909–14, after it was made nominally compulsory throughout the Navy.

The admission-rates per 1000 for venereal diseases were as follows :—

—	Gonorrhœa.	Chancroid.	Syphilis.
1903–1908 ... ...	47·23	13·12	22·03
1909–1914 ... ...	91·91	33·18	23·37

The apparent enormous increase in gonorrhœa and chancroid is largely discounted by the consideration that in 1909 it was ordered that all cases of venereal disease should be admitted for one day to hospital for inspection, and the figures after that date therefore include all cases such as were formerly treated outside hospital. But when all possible deduction is made on this count the figures cannot be made to show any improvement following the institution of preventive treatment. The "damage rate" representing the number of days' work lost owing to venereal disease gives no better results even when corrected for the fallacy stated above. A slight improvement in the figures for syphilis seems amply accounted for by the introduction of salvarsan.

The results so far stated are thus contradictory, showing a very definite success in several military and naval depôts on a comparatively small scale and an equally definite failure in the U.S. Navy over a period of years. This contradiction points to the existence of some factor or factors making for failure in the application of the method in the Navy. The failure can hardly be inherent in the method itself or it could not succeed as it has succeeded both in the laboratory and at military depôts.

Two more sets of figures quoted by Holcomb throw some light on what these factors are. The first set shows the extreme importance of every hour allowed to elapse between exposure to infection and the application of prophylactic treatment.

Thus of 1385 exposures treated within the first 8 hours 19 developed disease, a percentage of 1·37.

Of 74 exposures treated between the eighth and twelfth hours 25 developed disease, a percentage of 33·7.

Of 927 exposures treated between the twelfth and twenty-fourth hours 47 developed disease, a percentage of 5·1.

It may be supposed that in any ship where discipline in this matter was not rigid or where the medical officer was not sufficiently alert a number of men must have received their treatment too late. That this was almost certainly the case is borne out by another set of figures showing, besides the apparent ineffectiveness of the treatment, how large a number of men failed to report for prophylaxis, although nominally compelled to do so. 1338 men were given between them 32,791 "liberties" on shore in the course of 15 months. In this period 3268 preventive treatments were given. Among these men in the 15 months there occurred :—

140 cases of gonorrhœa, 77 of whom had not applied for treatment.

61 cases of chancroid, 26 of whom had not applied for treatment.

15 cases of syphilis, 12 of whom had not applied for treatment.

Thus within 15 months 115 out of 1338 men avoided prophylaxis after exposure and developed venereal disease. This does not indicate a high state of discipline in the matter, and suggests that the treatment may have been carried out carelessly and in a manner distasteful to the men. It must also be remembered that the figures for the whole Navy include not only cases which have avoided preventive treatment, but also some who had already become infected before entering the service. In the U.S. Army it is officially stated that 17 per cent. of recruits are syphilitics at the time of enlistment. The percentage of Navy recruits may be lower, but is probably appreciable, and inspection may well have become more careful since 1908.

It seems fair to conclude that early preventive treatment is a successful method of combating venereal disease subject to the conditions that the treatment is made acceptable to the men and is actually compulsory, and that it is carried out within a very few hours after exposure to infection. Our correspondent suggests that the naval and military authorities in this country would do well to consider the publication of any statistics in their possession bearing on the subject for the guidance of the civilian administrative bodies which are now giving earnest attention to the control of venereal diseases.

## PARIS.

(FROM OUR OWN CORRESPONDENT.)

### *The Work of the Service de Santé in the Eastern Campaign.*

M. Picqué recently dealt with the work of the Service de Santé in the Near East at a meeting of the Academy of Medicine. In the Dardanelles campaign he said that the doctors had to grapple with unheard-of difficulties owing to persistent bombardment by the enemy of the sanitary posts. Doctors and attendants were killed or wounded while at work, and it was necessary to remove the greater number of the wounded to the hospital ships. One field hospital had, nevertheless, dealt with 8500 wounded men, on whom 470 operations were performed. M. Picqué illustrated the very grave difficulties in the transport of wounded from trench to field hospital and on to hospital ship, a service of which he was himself in special charge. He made quite clear the real utility of aid-posts, on which rather too much doubt has been cast by the surgeons, and deduced the necessity of stationing at them experienced surgeons to arrest haemorrhage and ensure asepsis. In Macedonia the Service de Santé had also encountered grave difficulties. M. Picqué paid a tribute to General Sarrail, for, owing to his co-operation and that of M. Ricotti, chief of the service, the base hospitals alone are in possession of 20,000 beds. The surgical practice is distributed over 9 hospitals, of which 7 are temporary ones, all comfortable, some excellently well equipped, and challenging comparison with similar installations in Paris itself.

### *Aural Mischief Among Aviators.*

At the Paris Society of Medicine Dr. André Castex stated recently that a large proportion of aviators are among the men presenting themselves at the oto-rhino-laryngological consultations of the Military Hospital Villemin in Paris. From a series of observations it appears that on rising to an altitude approaching 1500 metres all the upper respiratory tract (pharynx, nasal passages, and, above all, the ears) become congested. The aviator relieves his discomfort by breathing through the mouth and practising Valsalva's

experiment. At about 4000 metres his troubles disappear, to return on the descent. On landing deafness is present, lasting sometimes a considerable time, and now and then he bleeds from the ears. These disturbances are, of course, due to the variations of atmospheric pressure. As the aviator rises the external pressure is less than that within the tympanum, Eustachian tube, and, possibly, blood-vessels. On the descent this is reversed. His troubles are accentuated if the aviator has some degree of oto-sclerosis or any malformation of the nasal passages, or if he travels in a noisy machine. A little deafness does not prevent a man from being an excellent aviator, but in rising it is a useful precaution to practise Valsalva's and in descending Toynbee's method. Complete rest for a quarter or half an hour is useful upon landing. Persistent aural trouble yields to rest prolonged over a month.

#### *Industrial Accidents and War Wounds.*

For slight accidents to operatives engaged in controlled factories the military doctors have hitherto granted seven days' leave for convalescence, following the practice applicable to soldiers wounded at the front. The Under Secretary of State for the Military Service de Santé has recently directed a circular to the local directors of the service, informing them that this procedure is inadmissible. The origin of the wounds is not the same. The wounded soldier is in need of rest and of the moral comfort which a home visit will give him, but the mobilised operative is not subject to the same fatigues and dangers, and as a rule already lives at home. An accident during work implies half-pay at the expense of the employer. The injured operative should therefore resume work as soon as he is restored, since the national defence demands intensified production.

#### *The Prophylaxis of Wound Infections.*

Professor Vincent has made a communication on bacterial prophylaxis at the Academy of Medicine. While the wounded man, with his emergency dressing applied at the dressing station, is transported to the field hospital a delay of several hours (from four to eight hours on the average, but often much more) occurs during which bacteria can multiply without hindrance. Sometimes this has already occurred within four or five hours, and in this race between sepsis and surgeon the latter may arrive too late. To prevent this rapid multiplication of bacteria M. Vincent lays down rules of true surgical prophylaxis comparable to those applied to infectious diseases. The surgical future of the wounded man often depends on his first dressing. M. Vincent proposes, therefore, that the wounds should be carefully dredged with a powder composed of 10 parts of hypochlorite of calcium and 90 parts of dry crystallised boric acid. All ramifications are carefully filled up with this powder. For wounds requiring drainage the antiseptic is insufflated into their depths. The application is very simple and produces no pain. A dry dressing of this kind brings the wounded man to the operating table in practically the condition he was in when struck down in the firing line.

#### *Unshapely Noses Corrected Surgically without Scar.*

M. Julien Bourguet reports success in correcting all ungraceful forms of nose, leaving the skin intact. He classifies unshapely noses into five principal groups: blobby, crooked, saddle-shaped, long, and broad. To improve them M. Bourguet operates through the nares under local anaesthesia, separating the skin from the subjacent framework, removing exuberant bone and cartilage by means of a small saw or a file in the case of bosses, and reapplying skin and subcutaneous tissue to the amended framework. In noses which deviate from the straight M. Bourguet luxates the nasal bones, and after fracturing the perpendicular plate of the ethmoid accurately centres the nasal framework, holding it in position by means of an intranasal splint or an external dressing until consolidation is complete. Saddle-backed noses are corrected by taking a fragment of the required size from the tibial crest enveloped in its periosteum and grafting it under the skin of the nose. In dealing with a nose that is too long M. Bourguet removes a triangular piece of the septum and triangular cartilage so as to restore the nose to its normal proportions. Finally, he corrects noses that are too broad by bringing together the ascending processes of the maxilla towards the mesial line, and removing a portion of the cartilage of the ala. After disappearance of the œdema transformation is complete without a vestige of scar.

## Obituary.

WALTER HAMILTON HYLTON JESSOP, M.A.,  
M.B. CANTAB., F.R.C.S. ENG.,

PRESIDENT OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM AND SENIOR OPHTHALMIC SURGEON TO ST. BARTHOLOMEW'S HOSPITAL.

IT is with very great regret that we have to announce the death on Friday last, Feb. 16th, of Mr. Walter H. H. Jessop from pneumonia after a short illness. Little more than a week ago he was apparently in excellent health, full of the energy and almost youthful spirits with which his friends were so familiar. It is doubtful, however, if before he was attacked with the fell disease to which he succumbed he was in as healthy a state as his natural buoyancy seemed to indicate. Ever since the beginning of the war he had given himself unsparingly to the services of wounded soldiers at No. 1 General Hospital, Camberwell, and elsewhere, in addition to the performance of his ordinary duties at St. Bartholomew's Hospital and at home. Moreover, as we shall have occasion to mention later, he was enthusiastically engaged upon several schemes for the organisation and advancement of British ophthalmology, all of which entailed heavy labours, such as would have tired out a much younger man. A recent appreciation of the late Duke of Norfolk has said that "he died 70 years young." It is equally appropriate to say that Jessop died 64 years young, for he was young in his physical strength, young in his thoughts, his enthusiasms, his aspirations, and even in his foibles. Some years ago he had a very serious motor accident, and it may be that he was never quite the same man after it. Yet there was little evidence of such being the case, and if he felt shaken he concealed it successfully even from his intimate acquaintances.

Walter Jessop was born in 1853, being the son of Walter Jessop, F.R.C.S., of Cheltenham. He was educated at the College, Cheltenham, until his father's death, when he was transferred to the Modern School, Bedford, where he gained the Harpur exhibition of £200. He then started working for the Indian Civil Service, but in 1871, having won the valuable Tancred studentship in medicine, which is held at Gonville and Caius College, Cambridge, he proceeded to that College. In 1876 he graduated in Arts at Cambridge, and joined the medical school of St. Bartholomew's Hospital for the completion of his medical studies. He became a Member of the Royal College of Surgeons of England in 1880, and four years later took the Fellowship, graduating also in medicine at Cambridge. He joined the teaching staff of St. Bartholomew's Hospital in 1882 as demonstrator of anatomy, and remained in the dissecting rooms of the hospital for nearly 13 years. He proved himself an excellent teacher, and was, moreover, though strict, popular with the students. At this time, in spite of early evidences as to the direction which his energies would take, his actual professional future was uncertain, owing to the long period before any vacancy occurred at St. Bartholomew's for an ophthalmic surgeon. But in 1894, on the resignation of Mr. Henry Power, he became junior ophthalmic surgeon to the hospital, the holder of that post, Mr. Bowater Vernon, taking Mr. Power's appointment. He had already been elected surgeon to the Central London Ophthalmic Hospital and ophthalmic surgeon to Paddington Green Children's Hospital. His election to the staff of St. Bartholomew's Hospital, though warmly contested, had already been amply justified. In 1885, soon after the introduction of cocaine by Koller, Jessop made an exhaustive research on the action of this drug on the eye. It was a painstaking and well-executed piece of work, and the conclusions at which he arrived have been confirmed by all later observers. Henceforth he devoted himself to the clinical aspects of his special subject, but these papers on cocaine prove that, had he been so minded, he would probably have been successful in more purely scientific research. In 1887 and 1888 he delivered the Hunterian Lectures at the Royal College of Surgeons of England, taking for his subject the anatomy and physiology of the intraocular muscles, and in the latter year he made a communication on the same subject to the International Ophthalmic Congress. From 1885 until his death every volume of the Transactions of the Ophthalmological

Society contains papers and communications from his pen. It is true that they consist chiefly of reports of cases and contributions to discussions, but they combine to show a vast knowledge of ophthalmology and an eminently level-headed clinical acumen. He was always abreast of the times, and never more so than in the last years of his life. This fact is borne out by his recent communications to medical societies on war injuries of the eye, trench nephritis, and other cognate subjects. In addition to contributions to societies and medical journals Jessop wrote articles on ophthalmic subjects in various surgical text-books, while in 1898 he published an excellent manual on "Diseases of the Eye," of which a second edition appeared in 1908.

It would be wholly unjust, however, to judge Jessop's place in British ophthalmology by his writings only, for he was not a ready writer. As a matter of fact, he made a unique position for himself. Filled with a patriotic desire to advance British

ophthalmology and to proclaim and insist upon its just recognition by other nations he constituted himself an international intermediary. He was a member of the Belgian, Spanish, and American Ophthalmological Societies *honoris causa*, and also an honorary member of the Budapest Medical Society in his capacity as an ophthalmologist. There was scarcely an International Congress of Medicine or Ophthalmology which he did not attend, and he was frequently present at the annual meetings of the Heidelberg and Paris societies, nearly always of recent years being voted to take the chair at one of the sessions. No one in England knew more continental ophthalmologists and many of them were his intimate friends. His home was always at their disposal, and Landolt, Straub, Axenfeld, and a host of others were often his guests. It was one of his greatest foreign



WALTER H. H. JESSOP, M.A., M.B. CANTAB., F.R.C.S. ENG.,  
PRESIDENT OF THE OPHTHALMOLOGICAL SOCIETY.

friends, Professor Straub, of Amsterdam, who suggested to Jessop that the war had knelled the doom of German ophthalmic literature. The ophthalmic surgeons of neutral countries, who had been accustomed to send their papers to German journals, were now deprived of an international medium of publication. Jessop, who had so soon to deplore the loss of his friend, seized upon the opportunity then presented. In 1915 he was elected President of the Ophthalmological Society. He immediately made use of this commanding position to further the project of a single all-embracing and thoroughly representative British Journal of Ophthalmology. He lived to see the venture launched most successfully. He worked day and night for the new journal from the time of the inception of the idea to the very day when illness

prostrated him. If British ophthalmologists wish to erect a monument to him, *aere perennius*, none could be more appropriate than to make the journal in every respect worthy of the high ideals which he set before them. The suggestion that the existing British journals of ophthalmology be amalgamated with a view of forming a representative periodical, though it originated from Straub, was seized upon by Jessop with characteristic foresight and energy. He personally wrote to most of the senior members of the Ophthalmological Society, suggesting the establishment of a really representative British Journal of Ophthalmology at or before the termination of the war, and called a meeting at his house in Harley-street last summer. The idea was then approved, and a sub-committee of seven was formed to make arrangements with the existing ophthalmological journals as regards amalgamation, and to draw up a definite scheme. The sub-committee met

on several occasions, and reported that a limited liability company with a capital of £5000 should be formed to publish such a journal, which should incorporate the *Royal London Ophthalmic Hospital Reports*, the *Ophthalmic Review* and the *Ophthalmoscope*. Further recommendations were that the shares in the company be held only by registered members of the medical profession and that no transfer of shares be registered without the consent of the directors. This report was approved by the original committee and a general meeting of ophthalmologists to consider the proposals was called at the house of the Royal Society of Medicine towards the end of September. Jessop, who was appointed managing director of the new company, threw himself heart and soul into the onerous work of inaugurating the Journal, and it can scarcely be doubted that in doing so he severely taxed his strength.

As President of the Ophthalmological Society he took a paternal interest in the Bowman Library, which was founded by the society. But when the Section of Ophthalmology of the Royal Society of Medicine came into existence, and changes in the constitution of the Ophthalmological Society occurred, the latter body generously handed the Bowman Library over to the safe keeping of the Royal Society of Medicine. Jessop was elected librarian of the Bowman Collection, and he had already, with his usual vigour, commenced to fill the lacunæ upon its shelves. At the time of his death he was engaged upon this, and also upon another and larger piece of work, for the welfare of ophthalmology. In addition to the annual meeting of the Ophthalmological Society, which has

become an annual congress, there is another ophthalmological congress which meets yearly at Oxford, and there are several small ophthalmological societies scattered over the United Kingdom. It was his object to affiliate them all to the old society in order that there might be greater unity of purpose and that all should be permeated with the same spirit of goodwill. We understand that the negotiations to this end were proceeding satisfactorily, and we hope that loyalty to the lost leader will be an additional incentive to bringing them to the conclusion which he would have wished.

It remains to say a few words about Jessop the man. He was a man of the world in the best sense of the term. We have spoken of his perennial youth, his energy, and his *bonhomie*. His tastes were wide. He delighted in art and had an excellent judgment. He was a recognised connoisseur of certain modern artistic work. Of all kinds of painting he was an appreciative critic and sometimes a pioneer, being quite uninfluenced by popular or passing fashion. From instinct as a collector he anticipated the rise in prices obtained for prints and lithographs, always buying with great prudence. Of his Whistler prints he was justly proud; some of them are unique, and examples from his collection may be seen at the current exhibition at the Royal Academy. Jessop shared with his accomplished wife that taste and discrimination which made him welcome at the Burlington Fine Arts Club, of which he was a member, and he was a familiar figure at the private views of different galleries, where he was often a discreet and judicious purchaser. He loved music, and was a frequenter of the opera and classical concerts. He was fond of good literature, English and foreign. Perhaps he was never happier—at least, so it seemed to his guests—than when he and his wife, who shared, and, it may be, helped greatly to inspire, his artistic tastes, were entertaining friends in Harley-street or at his charming riverside house at Sutton Courtenay. Not that his country life was one of mere relaxation. He took his duties as a magistrate very seriously, was most punctual in attendance at the Bench, and was constantly asked to serve on special committees dealing with important public business.

Mr. Treacher Collins writes:—

The sudden and unexpected death of Mr. Walter Jessop has deprived the ophthalmological world of one of its most prominent and leading representatives. There are probably few British ophthalmic surgeons who were so widely known and esteemed as Jessop. He was a man richly endowed with what has been aptly termed “herd instinct.” He devoted much time and great energy in the promotion of the interests of his hospital, of his profession, and more particularly of that branch of the profession in which he specialised. He was never happier than when he found himself associated with others in the promotion of mutual interests. In the years before the war he was constantly flitting to and fro to different parts of the continent to attend meetings of the numerous ophthalmological societies with which he was connected, and over those proceedings he was frequently invited to preside. Quick to take up new ideas, and with a keen appreciation of what was good, he brought back from these meetings valuable information which he was always ready to impart to his less cosmopolitan colleagues. Jessop was reaching that time of life when an ophthalmic surgeon’s methods and opinions tend to become more reminiscent of the past than in accordance with new ideas. Anyone, however, who conversed with him on professional subjects soon came to recognise that there was nothing of the bache number about him. Though not naturally a fluent speaker, having a peculiar jerky manner of delivery, his instinctive sympathy with the feelings of his fellows was so great that he was often able to expound in a telling and forcible way the ideas which they desired to have expressed. It was this same instinctive sympathy which made him such an agreeable host and such a successful organiser. His generous hospitality at his house in Harley-street, which was at one time the residence of Mr. Gladstone, will long be remembered by many of his colleagues. Jessop was certainly seen at his best at the head of his table surrounded by leading ophthalmologists from all parts of Europe. Keenly appreciative of humour and anecdote, he had the happy knack of grouping his guests and drawing them out so as to promote the general interest and enjoyment. Never were Jessop’s tactful energy and powers of organisation so conspicuously manifested as in the latter years of his life. In 1915 he was elected President of the Ophthalmological Society of the United Kingdom, in the welfare and proceedings of which he had always taken a lively and active interest. On the assumption of the office of President his

exertions on its behalf became redoubled, with the result that, notwithstanding the war, its annual congress of three days last year was by common consent regarded as the most interesting and successful that it has held.

Mr. Holmes Spicer writes:—

From the time he left Cambridge perhaps the greatest interest in Jessop’s life was St. Bartholomew’s Hospital. After serving on the junior staff he was elected demonstrator of anatomy in 1882, which post he retained till he became ophthalmic surgeon in 1894. It was during this time that he made life-long friendships with colleagues such as Bruce Clarke and Lockwood, both of whom are now gone, but also with successive generations of Bart’s, men who owed much to his teaching. Life at this time was a struggle, there was no clear opening before him, it needed courage and tenacity to succeed. His election at Bart’s was strongly contested, and it was only later that success came to him: with it the sunnier side of his nature developed, and his real character showed itself. There was a tradition in the eye department at St. Bartholomew’s, and Jessop, who, though a Liberal in politics was by nature Conservative, set great store by the tradition; for example, it had been the custom to do the simple extraction of cataract without iridectomy, and Jessop followed the custom. There were ways of treatment, tricks of bandaging hallowed by custom, and justified by experience, which he maintained through life. As a surgeon he rather followed the French school. He had received austere training at Moorfields under Nettleship and others which made his practice solid. As a colleague I can only say that during the 16 years of our association we never had a disagreement, and rarely a difference of opinion; he was thoughtful and kind. As a story-teller he could entertain one for hours with the peculiarities and weaknesses of the world great and small; his method was impressionistic—a word, a half-sentence, or a smile supplied the place of lengthy explanation. His love of art was genuine and enthusiastic. I remember spending a delightful afternoon with him at Sir Hugh Lane’s collection of modern pictures in Dublin; although he did not himself practise any art, his judgment, taste, and knowledge were excellent. He loved to show his collections; his Whistler lithographs are famous. He would tell of the jealousies of collectors, and of a rival who, after offering very large sums for a unique specimen, finally handed him a blank cheque to fill in as he liked in exchange for the picture; that cheque was not filled in. At his country home he was always glad to see old friends or pupils, or to welcome distinguished foreign colleagues. Under his roof the guest was free to follow his own way, to join him in a morning swim in the river or a hard spell of gardening. He lived the free life of the country whenever he could get away from his work, and took his full share as a country magistrate and in other ways in the social life of his neighbourhood.

Walter Jessop lived a full life and has died almost suddenly when that life was at its fullest. The utmost sympathy will go out to his widow and daughter on their great loss.

CLAUDE LAMONT WHEELER, A.B., M.D.,  
EDITOR OF THE “NEW YORK MEDICAL JOURNAL.”

Dr. C. L. Wheeler died at his residence, Brooklyn, N.Y., on Dec. 30th, aged 52.

Claude Lamont Wheeler was born in Montreal on March 5th, 1864, the son of Dr. Thomas Brown Wheeler, and a nephew of William Wheeler, a former Governor of the State of Rhode Island. He took his degree in Arts at Laval University in Quebec, and graduated in medicine from McGill University, Montreal, in 1889. Twenty-six years ago he went to New York, and in 1902 he joined the editorial staff of the *New York Medical Journal*, then under the control of Dr. Frank P. Foster, the well-known writer on medical and literary subjects. Dr. Kenneth W. Millican, the late assistant editor of THE LANCET, was associated with Dr. Wheeler in the editorial work of the journal before returning to this country and joining our staff. In 1911, on the death of Dr. Foster, Dr. Charles E. de M. Sajous, of Philadelphia, and Dr. Wheeler became associated in the editorship. During his six years’ tenure of the editorship Dr. Wheeler not only maintained the high standard of the *New York Medical Journal*, but in many directions greatly improved that publication. He was peculiarly well adapted for the position of a medical editor. While his medical knowledge was extensive, his literary gifts were even more conspicuous. He possessed the literary instinct, which was supplemented by a high degree of culture. He was extremely well versed in classical literature, and as a writer he was concise in language and distinguished in style. Moreover, he was an excellent judge of the writings of other people. He knew

several languages, including French, German, Italian, and Spanish, and possessed a somewhat remarkable knowledge of Greek and Latin. To these advantages may be added those of a fine presence, engaging manners, and great tact. Dr. Wheeler was a very versatile man and of a distinctly artistic temperament. He was an amateur actor with decided histrionic gifts, a vocalist with an exceptionally good and well-trained voice, and an accomplished pianist.

Dr. Wheeler had been in failing health for a year or more, but up to within a few days of his death had strictly attended to his editorial duties. He may be said almost to have died in harness. Dr. Wheeler leaves a widow and young daughter.

### EDUARD HAGENBACH,

PROFESSOR OF CHILDREN'S DISEASES IN THE UNIVERSITY OF BASEL.

Eduard Hagenbach, who died recently in Basle at the age of 76, had occupied for 44 years the University chair of pediatrics, which had been specially created for him. The son and grandson of distinguished medical men in the cathedral city on the Rhine, he obtained his medical qualification at the moment when Streckeisen's indefatigable labour had resulted in providing Basle with a children's hospital and attached teaching school, the first of its kind in Switzerland; and after varied experience in Paris and elsewhere Hagenbach succeeded Streckeisen as chief of the children's hospital. To this and to the well-being in general

of the child Hagenbach devoted his life. A colleague says of him: "He understood the soul of the child as hardly another did, and his manner of dealing with children was full of charm, his small patients responding with warm affection in return." The crèches, the infant welfare centres, the children's convalescent homes in and near the city were all due to his strenuous advocacy through good and evil report. He gave many public lectures and contributed alone or with his pupils more than 150 articles on childish ailments to the medical press, chapters on rickets and whooping-cough being among his larger works. He was an enemy of all slipshod methods, and his writings were characterised by care and precision. But more than by these, his memory will be kept alive by the infant welfare movement in Switzerland, of which he was the pioneer.

**THE LATE MR. F. P. LANSDOWN.**—Francis Poole Lansdown, M.R.C.S., L.S.A., honorary consulting surgeon to the Bristol General Hospital, died at his residence at Lydford, Devon, on Feb. 12th, in his 84th year. He had retired from active work for several years, but at one time he had an extensive practice in Bristol and Clifton. He was on the honorary surgical staff of the Bristol General Hospital and formerly lectured on anatomy at the Medical School. He was Surgeon Lieutenant-Colonel (V.D.) of the 1st Gloucester Artillery Volunteers. Mr. Lansdown was much esteemed in Bristol and the district. He leaves a widow and a son, Mr. R. G. P. Lansdown, who is honorary surgeon to the Bristol General Hospital.

## A MONTHLY RECORD OF ATMOSPHERIC POLLUTION.

COMMITTEE FOR THE INVESTIGATION OF ATMOSPHERIC POLLUTION: SUMMARY OF REPORTS FOR THE MONTHS ENDING

August 31st, 1916.

Sept. 30th, 1916.

Place.	Rainfall in millimetres.	Metric tons of deposit per square kilometre.								Place.	Rainfall in millimetres.	Metric tons of deposit per square kilometre.									
		Insoluble matter.		Soluble matter.		Included in soluble matter.						Insoluble matter.		Soluble matter.		Included in soluble matter.					
		Tar.	Carbonaceous other than tar	Ash.	Loss on ignition.	Ash.	Total solids.	Sulphate as (SO <sub>3</sub> )	Chlorine (Cl).	Ammonia (NH <sub>3</sub> )		Tar.	Carbonaceous other than tar	Ash.	Loss on ignition.	Ash.	Total solids.	Sulphate as (SO <sub>3</sub> )	Chlorine (Cl).	Ammonia (NH <sub>3</sub> )	
<b>ENGLAND.</b>																					
Exeter	120	0·01	1·01	3·02	2·41	3·85	10·30	1·55	0·42	0·03	Exeter	67	0·02	0·90	2·56	0·70	2·31	6·49	0·87	0·34	0·03
Leicester	66	0·09	2·81	6·61	1·73	3·04	14·29	1·55	0·46	0·16	Leicester	42	0·09	3·33	4·23	0·84	2·01	10·50	0·88	0·27	0·08
London—											London—										
Metereological Office	138	0·05	2·67	3·41	1·66	3·88	11·60	2·19	1·27	0·13	Metereological Office	48	0·04	1·83	2·26	3·30	4·38	11·80	1·32	0·57	0·04
Embankment Gardens*	—	—	—	—	—	—	—	—	—	—	Embankment Gardens*	3	0·15	2·08	1·94	1·56	3·67	9·38	0·70	0·49	0·07
Finsbury Park	115	0·08	1·44	7·95	2·29	5·01	16·77	2·07	0·13	0·05	Finsbury Park	39	0·07	1·12	3·55	0·70	2·78	8·22	1·86	0·34	0·06
Ravenscourt Park	124	0·17	2·75	7·82	2·29	5·57	18·60	2·62	0·70	0·20	Ravenscourt Park	47	0·20	2·13	4·29	1·12	4·54	12·28	1·89	0·44	0·07
Southwark Park	86	0·06	2·49	7·83	1·88	3·91	16·16	1·95	0·65	0·10	Southwark Park	29	0·05	3·70	8·11	2·84	6·39	21·08	3·57	0·49	0·10
Victoria Park	83	0·30	4·30	6·80	1·99	5·45	18·44	1·44	0·60	0·09	Victoria Park	13	0·06	1·40	5·08	0·42	0·74	7·71	0·26	0·11	0·02
Wandsworth Com.	60	0·01	3·56	13·01	4·12	6·50	27·20	2·78	0·68	0·12	Wandsworth Com.	13	—	0·15	0·61	0·52	1·33	2·61	0·60	0·16	0·02
Golden Lane	118	0·08	2·16	3·78	3·32	2·37	11·70	3·01	0·97	0·31	Golden Lane	38	0·06	2·50	3·81	1·82	3·94	12·12	2·03	0·44	0·20
Malvern	62	Tr.	0·20	0·23	0·62	1·46	2·52	0·69	0·15	0·02	Malvern	29	—	0·23	0·23	0·36	0·82	1·64	0·39	0·08	0·03
Manchester—											Manchester—										
Queen's Park	44	—	—	—	—	—	11·00	—	—	—	Queen's Park	65	—	—	—	—	—	12·50	—	—	—
School of Technology	43	—	—	—	—	—	18·20	—	—	—	School of Technology	58	—	—	—	—	—	19·70	—	—	—
Newcastle-on-Tyne	67	0·28	5·10	10·14	2·83	5·80	24·15	2·59	0	0·13	Newcastle-on-Tyne	34	0·30	3·71	6·84	0·95	3·71	15·51	1·73	0·24	0·66
Rochdale	—	—	—	—	—	—	27·0	—	—	—	Rochdale	—	—	—	—	—	—	20·5	—	—	—
York	78	0·08	1·31	2·98	2·40	4·24	11·01	1·53	0·33	0·04	York	24	1·05	0·26	0·58	0·62	2·09	3·60	0·99	0·22	0·03
<b>SCOTLAND.</b>																					
Coatbridge	78	0·07	1·95	6·66	2·19	0·94	11·81	1·56	0·67	0·14	Coatbridge	29	0·03	0·44	1·00	0·81	2·35	4·63	0·92	0·22	0·07
Greenock	80	0·30	1·39	3·01	0·95	2·87	8·52	1·24	0·10	0·10	Greenock	50	0·15	1·30	3·15	1·92	3·42	9·93	1·69	0·23	0·10

\* No returns.

Tr. = trace.

† Collected from 20th only.

"Tar" includes all matter insoluble in water but soluble in CS<sub>2</sub>. "Insoluble ash" includes all earthy matter, fuel, ash, &c. One metric ton per sq. kilometre is equivalent to: (a) Approx. 9lb. per acre; (b) 2·56 English tons per sq. mile; (c) one gramme per sq. metre; (d) 1/1000 millimetre of rainfall.

The personnel of public health authorities concerned in the supervision of these examinations and of the analytical work involved remains the same as published in previous tables.

**ABERDEEN ROYAL INFIRMARY: ANNUAL REPORT.**—The annual report of the Aberdeen Royal Infirmary for 1916 states that during the year 3235 in-patients and 14,572 out-patients received treatment, 94 more in-patients and 678 fewer out-patients than last year. The average number of beds in daily occupation was 238, and the average number of days in hospital of each patient was 27. The death-rate was approximately 6·6 per cent. of cases treated. Deducting the deaths which occurred within 48 hours of the patient's admission, the death-rate was reduced to about 4·8 per cent., as against 5·1 in 1915. There was an increase of £1367 in the ordinary income, but a decrease in patient's payments was regrettably noted. The ordinary expenditure

was £1824 more than in the previous year, the added cost of butcher meat, milk, sugar, and coal accounting for practically the whole of that sum. The average cost per occupied bed was calculated to be £72 2s. 1d. and of each in-patient treated to be £5 3s. 2d. The board recorded their deep regret for the death of Dr. Arthur Hugh Lister, which occurred on July 17th on his way home from Egypt, where he had been on military duty. Dr. Lister had been a member of the honorary staff of the infirmary from March, 1897, as an assistant physician and after as a physician. In addition to his infirmary work, in which he displayed great fidelity and zeal, he rendered conspicuous service in the investigation and treatment of tuberculosis.

# The War.

## THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue :—

### Died.

Lieut.-Col. J. F. Flasham, Australian Army Medical Corps, qualified at Sydney University in 1894 and was in practice in Macquarie-street, Sydney, New South Wales, prior to joining the Expeditionary Force.

*Previously reported Missing, believed Drowned, now reported Drowned.*

Lieut. J. Cropper, R.A.M.C. (see THE LANCET, Dec. 16th, 1916, p. 1034).

### Wounded.

Capt. A. H. Ernst, R.A.M.C., attached Royal Engineers.

Capt. C. W. C. Robinson, R.A.M.C.

Lieut. W. J. Pearson, R.A.M.C., attached Royal Flying Corps.

Capt. W. M. Badenoch, R.A.M.C., attached Welsh Regiment.

Capt. J. H. Cuthbert, R.A.M.C., attached Royal Field Artillery.

Lieut. J. M. Hammond, R.A.M.C., attached Devon Regiment.

## OBITUARY OF THE WAR.

RUSSELL ELIOTT WOOD, M.D., C.M., F.R.C.S. EDIN.,  
LIEUTENANT-COLONEL, ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel R. E. Wood, whose death occurred suddenly at Dunbar on Feb. 9th, came of a family long distinguished in the medical annals of Edinburgh. He was educated at the Edinburgh Academy, where he took a keen

interest in athletes, afterwards graduating M.B., C.M. at Edinburgh University, later taking the Fellowship of the Royal College of Surgeons of Edinburgh, on the President's Council of which he served. He was also on the governing board of the School of Medicine of the College, and an examiner for the triple qualification. He held many appointments, and up to the time of his death was visiting physician to Donaldson's Hospital, Edinburgh. In his early days he served in the Zulu War, and as medical officer

to the Lanarkshire Yeomanry had maintained his connexion with the Army, rising to the rank of Surgeon Lieutenant-Colonel. Shortly after the outbreak of war he volunteered his services and was appointed to his old regiment.

Writing of Colonel Wood, a friend and colleague says of him: "He was genial and kind-hearted, an excellent practitioner, a keen sportsman, and a loyal friend. He will be sorely missed."

## DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war :—

Second Lieut. J. H. W. Stevenson, C.S.I., J.P., Indian Army, younger son of Surgeon-General Stevenson, of Castle-town, Isle of Man.

Capt. F. W. H. Simpson, Royal Garrison Artillery, attached Royal Flying Corps, only son of Professor W. J. R. Simpson, C.M.G., of Regent's Park, London.

Lieut. J. St. E. Cardew, R.N. (retired), younger son of Mr. G. A. Cardew, M.R.C.S., of Cheltenham.

## THE HONOURS LIST.

The following promotions of and awards to medical officers are announced :—

C.M.G.—Col. P. Hehir, C.B., I.M.S.

To be *Brevet Colonels*.—Lt.-Col. W. G. Beyts, R.A.M.C.; Lt.-Col.

L. P. More, R.A.M.C.

To be *Brevet-Lieutenant-Colonels*.—Maj. A. W. C. Young, I.M.S.;

Maj. F. A. F. Barnardo, I.M.S.

*Bar to Military Cross*.—Temp. Capt. A. C. Hancock, M.C., R.A.M.C.

### Foreign Decorations.

The names of the following medical officers appear in a lengthy list of decorations awarded by the Allied Powers at various dates to the British forces for distinguished services rendered during the course of the campaign, which the King has given unrestricted permission to wear :—

*By the Emperor of Russia.*

*Order of St. Anne, 3rd Class (with Swords)*.—Col. Gerald Cree, C.M.G., A.M.S.

*By the King of Serbia.*

*Order of the White Eagle, 2nd Class (with Swords)*.—Surg.-Gen. Francis Harper Treherne, C.M.G.

*Order of the White Eagle, 3rd Class (with Swords)*.—Lt.-Col. (temp. Col.) A. E. C. Keble, D.S.O., R.A.M.C.

*Order of the White Eagle, 4th Class (with Swords)*.—Maj. R. W. Knox, D.S.O., I.M.S.; Maj. R. S. McGregor, Aust. A.M.C.; Lt.-Col. J. R. Whait, R.A.M.C.; Maj. R. J. Bradley, I.M.S.; Lt.-Col. (temp. Col.) D. J. Collins, R.A.M.C.; Maj. W. S. Patton, I.M.S.; Lt.-Col. R. Steiman, R.A.M.C.

*Order of the White Eagle, 5th Class (with Swords)*.—Capt. H. J. M. Curtsejee, I.M.S.; Capt. J. G. F. Hosken, R.A.M.C.; Capt. W. R. C. Mainwaring, Aust. A.M.C., attached Aust. Light Horse; Temp. Capt. R. A. Mansell, R.A.M.C.; Capt. R. Proutfoot, R.A.M.C.; Capt. H. G. Trayer, R.A.M.C.; Capt. (temp. Lt.-Col.) H. Wade, R.A.M.C.; Capt. (temp. Maj.) E. T. Burke, R.A.M.C., Spec. Res.; Capt. H. Falk, I.M.S.; Capt. E. S. Goss, I.M.S.; Capt. V. B. Green-Armystage, I.M.S.; Lt. N. S. Jatar, I.M.S.; Temp. Capt. J. A. Arkwright, R.A.M.C.; Capt. R. C. Carlyle, R.A.M.C.; Capt. (temp. Maj.) E. L. Rowse, R.A.M.C.

*By the King of Belgians.*

*Officier de l'Ordre de la Couronne*.—Temp. Maj. H. S. Souttar, R.A.M.C.

## THE CENTRAL MEDICAL WAR COMMITTEE.

At a meeting of the Central Medical War Committee on Feb. 21st the chairman, Mr. Verrall, speaking on the question of the immediate outlook in respect of additional doctors for the Army, and particularly in regard to the matter of calling up the whole or part of the enrolled men, said that some new departure would, in his opinion, have to be made, because even if the enrolled men were immediately called up there would not be obtained the numbers demanded by the War Office. A statement was made by Dr. Buttar, the chairman of the Executive Subcommittee, in the course of which he urged that every effort should, in the first place, be made to obtain the last man possible from those of military age. He considered that there were several reasons for postponing an immediate call upon enrolled men, in view of the possible development of the scheme of the Director-General of National Service and the proposal which was in the air to make a general call for national service upon all classes of the population under the age of 50. He thought that it would be well to take an early opportunity of reviewing the War Office demands in the light of recent developments.

The Committee discussed again the question whether the whole-time service of the country had contributed their fair quota of medical recruits to the Army. It was reported that an interview had taken place with representatives of the Local Government Board and the Board of Education, when facts were brought forward showing that in respect of the Poor-law Service the Local Government Board did not feel itself in a position to make any further serious calls, while it had already spared a large number of whole-time officers on the public health side. Readiness was expressed both by the Local Government Board and the Board of Education to consider any individual calls which the Committee might think it necessary to make upon their officers, but it was pointed out that the Boards had no power to call up medical men in the employment of local authorities, although they were willing to represent to such authorities the need for making the necessary sacrifices.

Finally, the Committee instructed the Executive Subcommittee to inquire carefully into the matter of the enrolled men, and to report to the full Committee on the question of notifying Local Medical War Committees that the necessity of calling upon enrolled men might arise in the near future, indicating in each case the number that it was estimated ought to be supplied from the area.



## THE DISABLED SAILOR AND SOLDIER.

At the third Galton anniversary meeting on Feb. 16th Major Leonard Darwin, while admitting that the greatest eugenic task of all lay in promoting the early return to work after the war of the uninjured man, pointed out the need of the British Empire for the fine qualities of courage, endurance, and patriotism shown by the men of our volunteer armies. It was necessary to ensure that the men who returned disabled from abroad should have at least an equal opportunity with those, who had proved unfit to serve in the Navy or Army, of forming homes and passing on their good qualities to future generations. The hardships to be endured during active military service were such that even the soundest of men were liable to suffer from disease, but those men discharged for disease contracted at the front were nevertheless, as a class, capable of handing on a strong constitution to their children.

The subject of the manual training of the disabled soldier in military hospitals came up last week in Parliament, when Lord H. Cavendish-Bentinck asked the Under Secretary for War whether with reference to a recent Army Council Instruction ordering the discontinuance in military and auxiliary hospitals, convalescent camps, and command depôts of instruction in trades and occupations, workshops, and poultry-farms, he would state the reason for this order, putting an end to teaching which was very beneficial to the mental and bodily health of the patients. Mr. Macpherson, in reply, regretted that no hope could be held out of the order being reconsidered. Hospitals, convalescent camps, and command depôts generally, if they were to fulfil their proper functions of getting the men fit for discharge as quickly as possible, and so setting the accommodation free for other patients, must be entirely devoted to the purposes of medical treatment. There were, he added, special hospitals where manual training formed part of the sanctioned system of curative treatment. In the debate on the Consolidated Fund Bill, Lord H. Cavendish-Bentinck returned to the subject and said:—

There ought to be a complete system of out-patient treatment of discharged soldiers. It should not be beyond the resources of the Army authorities to provide accommodation both for the freshly wounded and for those recently convalescent in order that they might get perfectly cured. He could not help thinking that the War Office had taken a retrograde and reactionary step in issuing an instruction abolishing all the trade schools and classes in hospitals and auxiliary hospitals. It had gone so far as to forbid people in charge of hospitals keeping poultry. People used, he said, to rely on mechano-therapy, but it was now being found that disabled men could be restored better by technical training than by mechanical appliances. It had further been discovered that there was no likelier way to restore a man suffering from shell-shock and nervous disorders than to give him some useful occupation. It was deplorable if the Army authorities were to abolish the attempt of giving men like this something to do. If the Statutory Committee had been able to organise a perfect system of training the case would be different.

**THE ARMY AUTHORITIES AND INCURABLE SOLDIERS.**—Our Dublin Correspondent writes: Some weeks ago the committee of management of the Royal Hospital for Incurables, Dublin, wrote to the Government authorities suggesting the establishment of a Government hospital in Ireland for the care of sailors and soldiers who had become afflicted by incurable diseases as the result of war conditions. At its last meeting the committee had under consideration a reply received from Surgeon-General Sir Richard Ford, D.D.M.S., Irish Command. He wrote that the establishment of a special hospital for the purpose suggested would entail considerable expense and might not be necessary. As an alternative, arrangements were being made with the Red Cross authorities to send incurable soldiers to the several county infirmaries, the cost of their maintenance to be borne by the Red Cross funds. The committee of management of the Royal Hospital for Incurables has published a strong protest against this proposal, which, on every ground, seems to be unsuitable. The county infirmaries are active surgical hospitals, quite unfitted to serve as permanent homes for incurable patients, whose presence, moreover, would interfere with the normal working of the infirmary. For another reason the proposal appears even more improper. There is no justification for the attempt

to shift the responsibility for the care of incurable soldiers from the Army authorities to a voluntary fund. Men who have been so unfortunate as to suffer permanent disability as a result of war service are entitled to the security of maintenance by the State, and are not to be put off as mendicants dependent on voluntary charity. It is generally felt that if the scheme outlined by Surgeon-General Ford is persisted in the county infirmaries will prove only half-way houses to the workhouse wards.

**HEALTH OF THE GERMAN ARMY.**—To the wireless summary of the health statistics of the German Army, given in THE LANCET of Jan. 20th, p. 126, during the first two years of war, we can now add the actual official figures of illness per 1000 of the actual strength:—

	1st year.	2nd year	1st year.	2nd year
Small-pox	0·01	0·00	Measles	0·07
Typhoid	5·60	1·40	Diphtheria	0·24
Typhus	0·03	0·08	Tuberculosis	2·90
Dysentery	2·80	1·80	Pneumonia	6·80
Asiatic cholera	0·32	0·24	Pleurisy	7·70
Recurrent fever	0·17	0·80	Nerve diseases	24·30
Scarlet fever	0·18	0·15		21·50

The only diseases in the list showing any increase are typhus (nearly trebled), recurrent fever (nearly quintupled), and diphtheria (more than doubled). The last named has had the same increased prevalence among the civilian population.

## THE SERVICES.

## ROYAL ARMY MEDICAL CORPS.

Majors (acting Lieutenant-Colonels) relinquishing their acting rank on reposing: W. J. P. Adye-Curran, W. F. H. Vaughan, Major H. H. A. Emerson, D.S.O., to be Acting Lieutenant-Colonel whilst in command of a Casualty Clearing Station.

To be Acting Lieutenant-Colonels whilst in command of a Field Ambulance: Major J. P. Silver, D.S.O., Capt. (Acting Major) W. J. H. Bell, D.S.O., Capt. R. B. Phillippe, Major G. W. G. Hughes, D.S.O., Capt. A. I. Fortescue.

To be Acting Lieutenant-Colonels whilst in command of a Stationary Hospital: Major M. Sinclair, Major R. B. Ainsworth, D.S.O.

To be temporary Lieutenant-Colonels: Lieut.-Col. Sir Ronald Ross, K.C.B. (Major, retired, I.M.S.), J. W. W. Stephens, Temp. Major R. B. Kelly (Captain, R.A.M.C., T.F.).

Temp. Capt. R. H. J. Swan to be temporary Major.

Temp. Capt. (acting Major) R. H. Jones relinquishes his acting rank on reposing.

To be acting Majors: Capt. C. H. H. Milner, R.A.M.C., T.F., whilst in command of General Hospital; Capt. W. J. Tobin, whilst in command of Field Ambulance; Temp. Capt. A. B. Seller, whilst in command of troops on a hospital ship.

Temp. Capt. (local Major) R. B. K. Paton relinquishes his local rank on reposing.

Temporary Lieutenants (Canadian Militia), Canadian A.M.C., to be temporary Captains: H. E. Brown, from Lieutenant, R.A.M.C., P. W. Barker, from Captain, R.A.M.C.

Temporary Lieutenants to be temporary Captains: J. Cameron, H. A. G. Hadden, G. W. Spencer, W. A. Cochrane, W. G. Parker, J. H. P. B. Barrett, B. Cox, W. Dickson, P. A. Reckless, G. J. Jones, S. J. C. Fraser, D. Burns, I. Feldman, E. E. Hart, S. A. W. Munro, D. H. Hall, J. J. O'Neill, D. Lee, G. P. White, R. M. Rowe, W. Brownlie, R. Johnson, T. Dowzer, E. J. Clark, W. P. Speedy, R. A. Warters, A. D. Moffat, J. J. Clarke, R. E. Illingworth, A. D. Hunt, A. W. Mather, A. C. Tait, O. W. C. Robinson, W. M. Buchanan, W. J. Pearson, E. L. Christoffels, C. F. MacLachlan, J. G. M. Moloney, A. D. Buchanan, W. D. D. Small, R. M. Hewitt, J. P. Fairley, M. C. Bridgeman, A. McNally, A. E. McCulloch, G. H. Hanley, G. H. Kearny, H. O. Fox, E. W. Martin, W. M. Muirhead, J. Bain, R. R. Watts, C. M. G. Elliott, P. W. Craig, J. Oag, A. McL. Pilcher, J. F. St. J. Annesley, A. H. Donaldson, J. McF. Grier, F. R. Marriott, G. W. Huggins, B. C. Sparrow, A. H. Ernst, R. N. Craig, A. H. G. Burton, W. G. Porter, J. A. MacArthur, T. C. Bowes, B. Graves, D. S. Robertson, J. H. C. Fegan, H. Younger, A. J. L. Speechly, A. N. Cox, W. S. T. Connell, H. G. Carlisle, F. C. Stewart.

To be temporary Captains: G. O. Scott, Canadian A.M.C.; W. . Hale, Canadian A.M.C.

B. S. Phillips to be temporary Honorary Lieutenant whilst serving with British Red Cross Hospital, Netley.

Temporary Captains relinquishing their commissions:—W. B. Thompson, R. J. H. Cox, C. L. Morgan, F. A. Bainbridge, J. Fettes, O. F. McCarthy, W. Winslow, C. H. Phillips, C. P. V. MacCormack, C. W. Roe, R. H. Fothergill, B. M. Collard, R. B. Jackson, T. H. Agnew, J. P. Laverty, H. H. Scott, C. G. R. Pennant (on account of ill-health).

The undermentioned, having resigned their appointments at the Welsh Hospital, Netley, relinquish their commissions: Temp. Hon. Capt. J. S. Rowlands and T. G. Evans, Temp. Hon. Lieuts. W. MacAdam and D. J. Harries.

L'ebenants relinquishing their commissions:—T. M. Body, H. A. R. E. Unwin, D. M. Hanson, H. Farncombe, J. Massey, M. J. Harkin, W. A. L. Marriott, D. A. Thomson, A. Brebner, H. Tonks, G. O. Scott, C. M. Scott, J. Dunbar, S. M. Comb, C. M. Jones-Phillipson, F. J. C. Blackmore, J. Bryan, O. Le F. Milburn, H. W. P. Parrott, R. A. R. Green, T. Winning, G. F. Palmer, L. W. Oliver, A. L. Singer, I. J. Balkin, E. G. Pringle, W. Stevenson, M. Campbell, R. Montgomery, G. Fitz-Gerald, C. S. Rivington, W. B. Mercer, S. Stockman, F. J. Rager, J. McConnell, W. M. Nairn, H. de L. Crawford, W. W. Jones.

Temporary Lieutenants relinquishing their commissions: J. S. Johnson, T. G. H. Drake, A. H. B. Kirkman, and A. E. Whitmore, and A. S. Paterson (on account of ill-health).

The undermentioned, having resigned their appointments with No. 8 British Red Cross (Baltic and Corn Exchange) Hospital, relinquish their commissions: Temp. Hon. Lieuts. C. H. Drennan and C. E. Sparks.

SPECIAL RESERVE OF OFFICERS.

Capt. H. M. Williams to be Acting Major whilst in command of a Field Ambulance.

Lieutenants to be Captains: T. Blackwood, J. P. Broom, A. C. Brown, J. W. Dalglash, J. F. Duthie, J. Ewing, E. G. S. Hall, R. W. MacDonald, D. B. McIntosh, J. W. Maclean, A. F. McMillan, R. Rodger, J. A. Buchanan, G. Lapage, J. M. H. Campbell, P. D. H. Chapman, E. B. Alabaster, J. B. Steven, K. J. T. Wilson, R. Isbister, T. Gray, M. Dwyer, J. M. Downie, H. S. Moore, R. B. Stewart, R. L. Portway, D. F. Standing, R. J. Staley, W. J. Vance, W. F. T. Haultain, G. J. Key, A. H. Craig, G. Ewen, W. D. Whamond, D. D. Evans, W. H. Dye, G. E. Kidman, F. J. Murphy, A. Fowler, A. G. Stevenson, A. C. MacDonald, O. Johnston, W. C. Borrie, S. J. Henderson, R. B. Hick, W. O. F. Sinclair.

Lieut. (on probation) J. P. Macnamara is confirmed in his rank.

To be Lieutenants: J. H. Thomas, D. J. Thomas, J. Burke, H. D. McIlroy, H. St. H. Ve-tue, C. J. Penny, S. A. T. Ware, H. J. Blampied, R. R. Traill, L. G. Blackmore, L. S. Gathergood, K. N. G. Bailey, M. C. Joint (from University of London Contingent, O.T.C.), H. Franklin (from Leeds University Contingent, O.T.C.), R. W. Lush, B. R. Longstaff, W. Andrew.

Capt. J. O. Hamilton relinquishes his commission on account of ill-health.

Lieut. (on probation) A. F. Grimby relinquishes his commission on appointment to Royal Navy.

TERRITORIAL FORCE.

Capt. R. A. Hooper, from 1st Northern General Hospital, to be Captain.

Capt. (temp. Major) R. W. Brimacombe to be Acting Lieutenant-Colonel whilst commanding a Casualty Clearing Station.

Capt. A. G. Whitfield relinquishes his commission on account of ill-health.

Capt. (temp. Lieut.-Col.) H. N. Goode relinquishes his temporary rank on ceasing to command a Field Ambulance.

Lieut. T. L. Ashforth to be Captain.

Capt. (temp. Major) C. S. Brebner and G. Mackie to be acting Lieutenant-Colonels whilst commanding a Field Ambulance.

Lieut. W. A. Milne to be Captain.

Capt. (temp. Major) J. Grounds relinquishes his temporary rank on alteration in posting.

W. J. Read to be Lieutenant.

HOUSEHOLD CAVALRY.

Surg.-Maj. J. H. Power to be Surgeon Lieutenant-Colonel.

DEATHS IN THE SERVICES.

Surgeon-General Sir Benjamin Franklin, K.C.I.E., honorary physician to the King, suddenly, at his residence, Westhay, East Sheen, on Feb. 17th, aged 73. He entered the Indian Medical Service in 1869, and after serving at Lucknow and Simla, held the position of surgeon to the Earl of Elgin, Viceroy of India (1894-99), subsequently officiating as Inspector-General of Hospitals in Bengal, the North-West Provinces and Oudh, and Punjab. He was British delegate to the International Sanitary Conference at Rome in 1907, and again at Paris in 1911-12. Sir Benjamin Franklin had held the post of Director-General of the Indian Medical Service and that of Sanitary Commissioner with the Government of India. He was a Knight of Grace of the Order of St. John of Jerusalem, and an active member of the Council of the British Red Cross Society. He received the K.C.I.E. in 1903. Although he had been in failing health since September last, he, nevertheless, continued to work as a member of the Red Cross Executive at the headquarters in Pall Mall.

URBAN VITAL STATISTICS.

(Week ended Feb. 17th, 1917.)

*English and Welsh Towns.*—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18,000,000 persons, the annual rate of mortality was equal to 22·5, against rates steadily rising from 16·2 to 21·3 per 1000 in the four preceding weeks. In London, with a population of more than 4,000,000 persons, the death-rate was 23·3, or 1·1 per 1000 higher than that recorded in the previous week; in the remaining towns the rate ranged from 13·5 in Ilford, 14·0 in West Hartlepool, and 15·0 in East Ham, to 33·9 in Warrington, 34·1 in Hastings, and 38·7 in Wigan. The principal epidemic diseases caused 299 deaths, which corresponded to an annual rate of 0·9 per 1000, and included 133 from measles, 52 from diphtheria, 49 from infantile diarrhoea, 37 from whooping-cough, 17 from scarlet fever, and 6 from enteric fever. The deaths from measles, scarlet fever, and whooping-cough were in excess of the average in the three preceding weeks; measles caused a death-rate of 2·2 in Warrington, 2·6 in Ilford, and 6·0 in Wigan. The 806 cases of scarlet fever and the 1436 cases of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 5 and 9 in excess of the numbers at the end of the previous week. Of the 7183 deaths from all causes in the 96 towns, 273 resulted from violence. The causes of 76 of the total deaths were uncertified, of which 14 were registered in Liverpool, 13 in Birmingham, and 6 in London.

*Scotch Towns.*—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death rate was equal to 20·1, against 17·7 and 17·9 per 1000 in the two preceding weeks. The 431 deaths in Glasgow corresponded to an annual rate of 20·1, against 23·3 per 1000 in London, and included 12 from whooping-cough, 7 from measles, 4 from infantile diarrhoea, 3 from diphtheria, and 1 from scarlet fever. The 136 deaths in Edinburgh were equal to a rate of 21·4 per 1000, and included 8 from whooping-cough, 3 from measles, and 2 from diphtheria.

*Irish Towns.*—The 208 deaths registered in Dublin were equal to an annual rate of 27·2, or 0·9 per 1000 less than in the previous week, and included 5 from measles, 2 from infantile diarrhoea, and 1 from whooping-cough. In Belfast the death-rate was 29·9 per 1000; the 225 deaths from all causes included 3 from measles, 2 from whooping-cough and 1 from infantile diarrhoea.

Correspondence.

"Audi alteram partem."

OFFICIAL MEDICINE AND THE THRIFTY SPIRIT.

To the Editor of THE LANCET.

SIR,—I see that according to the *Times* the Royal Society of Medicine, a day or so ago, entertained Sir Alfred Keogh to dinner at the Café Royal. As a Fellow of the Society, I may point out that it was not the Society but the Council Club which did this. Let me say at once that I am an ardent admirer of Sir Alfred Keogh and the work he has done for the Army, and the profession would honour itself in honouring him, in any way that might be thought fit, when the war is over.

I fail, however, to see how the Council Club of this Society can justify a dinner of such a kind at the Café Royal in present circumstances. Surely, Sir, at a time when we are threatened with a shortage of the very necessities of life, and at a time when the Food Controller has placed us on our honour not to overstep our food allowance, these gentlemen might find something better to do than to feast at the Café Royal. It is a curious fact that even among some of the leaders of the medical profession, intelligent men who might be expected to set an example, there appears to be a very faint conception of the fact that we are engaged in a struggle for our very existence. The Council of the Royal Society of Medicine, however, is not perturbed, the Council Club holds its dinner, and a number of the sections continue to hold their meetings, at which papers are read and specimens are shown which, in many instances, cannot be regarded as having any bearing upon the treatment of the sick and wounded of our armies, and so furthering the progress of the war. Considerable sums of money are spent also in issuing the Transactions of the Society containing these papers, most of which are never read.

As a further example of waste by members of the medical profession, I may instance the issue, recently, of the List of Fellows and Members of the Royal College of Physicians of London, forwarded, I believe, to every Fellow. This book of some 400 pages is made up mainly of a list of names and addresses, information all contained in the Medical Directory. I imagine the majority of the Fellows consign it to the waste-paper basket at once. How the authorities of the College can countenance such an expenditure in paper and printing at the present time I cannot imagine.

I am, Sir, yours faithfully,

A FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON AND OF THE ROYAL SOCIETY OF MEDICINE.

Feb. 20th, 1917.

SPIROCHÆTAL JAUNDICE.

To the Editor of THE LANCET.

SIR,—It is satisfactory to learn from Dr. Frederick Taylor's letter in your issue of Feb. 10th that the Royal College of Physicians' Committee on the Nomenclature of Diseases is prepared to discard the name Weil's disease for the form of infective jaundice which is caused by infection with a specific spirochæte. Dr. Taylor prefers the more cumbersome name of spirochætosis-icterohaemorrhagica to spirochætal jaundice because jaundice may occur in other spirochætal diseases, such as syphilis and relapsing fever; but the same argument may be used against the longer names, as haemorrhages are certainly as common as jaundice in syphilis and are not very rare in relapsing fever. On the other hand, jaundice is the most characteristic symptom of this spirochætal infection, but it is very rare in syphilis, and was not present in a single one of the six cases of relapsing fever I saw in Salonika. As the names syphilis and relapsing fever are so well established, I do not think there can be much fear that the name spirochætal jaundice would lead to confusion with the jaundice due to these diseases.

Lastly, the inappropriate terms English disease for rickets and German measles for rubella hardly encourage further attempts in this direction, especially as it is impossible, as Dr. Taylor points out, to distinguish between the claims

of France and Japan in deciding between "S. gallica" and "S. japonica." I am inclined to think, therefore, that no more accurate or convenient name than spirochaetal jaundice is likely to be found.—I am, Sir, yours faithfully,

Netley, Feb. 11th, 1917.

ARTHUR F. HURST.

### THE DATE OF WEANING.

*To the Editor of THE LANCET.*

SIR.—The Health Society of the Borough of St. Marylebone, of which the medical officer of health is chairman, has recently circulated a copy of certain recommendations which it has addressed to its borough council with the suggestion that a similar appeal may be sent to other borough councils "to strengthen the position." The committee's appeal is concerned primarily with the effects produced by the present costliness of cow's milk, and contains the following words:—

The medical officers of the infant consultations in St. Marylebone report that the work is failing short of success because their advice as to feeding cannot be carried out owing to the high price of milk. In many cases the baby, when it is weaned, whether early or at 9 months, goes short of milk and in consequence loses weight or at best puts on 1 or 2 oz. a week—where a healthy baby makes an average of 6. Often the mother does not feel justified in weaning at the proper time, as she sees no prospect of being able to afford the quart of milk a day (3s. 6d. a week) which the baby should have. So she continues to nurse the baby long beyond nine months to the detriment of her own health and that of the baby. .... Unless steps can be taken to enable the mothers to obtain milk at a lower price, the infant mortality rate is likely to be higher next year.

It is impossible not to be in sympathy with the spirit of this appeal, nor to regret the very real hardship which the high price of cow's milk entails to many poor families and weakly infants. But the particular form of these recommendations scarcely commands the same assent. In the first place, it is by no means clear whether the rates of gain in weight quoted are intended to apply to the early months of the first year or to those after the ninth month, and in either case for how long they should be maintained. At the rate of 6 oz. a week a child would gain 19½ lb. in a year. This is certainly above the average for the first year of life, and would be grossly pathological for the second. For the latter period 2 oz. a week (6½ lb. a year) is much nearer the normal. The medical officers, moreover, employ a common contradiction in terms when they urge that a child should be "weaned" at the age of 9 months, and in the same sentence declare that a quart of milk must still be included in the daily diet. The word "wean" should imply that the child can do without milk, not that a transference from one kind of milk to another takes place. Either 9 months is too early an age at which to recommend weaning in this sense; or, if it is the "proper" time, the child does not need a quart of cow's milk daily. Both statements cannot be scientifically correct.

I would respectfully submit that this needs wider recognition. It is not, Sir, merely an etymological quibble, but a point which very vitally concerns infants, and particularly those of the class of woman attending schools for mothers and similar institutions. The practice of continuing to nurse a child beyond the age of 9 months is extremely common. But in view of the stern moral denunciation which its mention frequently receives from the medical and nursing professions, women are most reluctant to admit that after this age their children still obtain breast-milk. As the result of a large number of inquiries and observations in cases where a longer period of nursing is customary, I have been quite unable to ascertain that a healthy woman suffers thereby any decline in strength. Evidence of any actual harm to the child from continuing to take the breast is equally difficult to obtain, so long as allowance is made for the very frequent mistakes in choosing food to supplement the milk about this age. From a biological point of view, this is so exactly what might have been expected that it seems desirable to take exception to the statement of the medical officers quoted above. For if it means anything at all, it means there is something in breast milk which after nine months of lactation is inherently harmful to the child, and that the act of suckling is at the same time necessarily detrimental to the woman. It is, I believe, extremely important to qualify any such assertion by explaining that it only applies to special cases where the mother is not healthy or the child is delicate. For such cases it would be a most excellent achievement to obtain special facilities for a supply of clean milk at cheap rates.

In support of its views the committee states that it has forwarded to the borough council a list of a "few cases which have been very carefully investigated and which are typical of a very large number of those attending schools for mothers." Most medical officers of such schools could, unhappily, do the same. But there would be no difficulty in collecting from another borough of London, no more favourably situated than St. Marylebone, a large body of evidence to demonstrate the point I am at pains to emphasise—namely, that many children of the poor classes are able to maintain a perfectly satisfactory rate of gain in weight after 9 months of age, and are yet practically independent of cow's milk as food, except in so far as it is used as a convenience in cooking. Indeed, were the price of cow's milk to be lowered to a point at which it was possible for these recommendations to come into force, and were every child to start consuming a quart daily after the age of 9 months, one is tempted to wonder whether a serious rise in the death-rate would not follow automatically; the very point this Health Society is anxious to prevent. Where, also, are the cows coming from to supply such a colossal demand?

I am, Sir, yours faithfully,

Gray's Inn, W.C., Feb. 21st, 1917.

HAROLD WALLER.

### SURGEON-PROBATIONERS.

*To the Editor of THE LANCET.*

SIR.—Surgeon-General Rolleston, R.N., in his remarks on the medical personnel of the Royal Navy (*THE LANCET*, Feb. 17th, p. 255) states that surgeon-probationers, R.N.V.R., were appointed after mobilisation. Reference to a Navy List of July, 1915, shows that the first appointment to a commission as above was made on April 22nd, 1914, and that seven appointments were made before mobilisation. I think it is due to the Director-General of the Navy that this fact should be known, as it shows that the arrangements for the utilisation of the services of medical students were thought out in peace-time.

I am, Sir, yours faithfully,

P. CALDWELL SMITH,

London, Feb. 17th, 1917.

Lieutenant-Colonel, R.A.M.C., T.

### THE PLACE OF SANATORIUM TREATMENT IN TUBERCULOSIS.

*To the Editor of THE LANCET.*

SIR.—In the leading article on Tuberculosis and the War in your issue of to-day's date, you give prominence to Dr. D. Dunbar's statement as to the relative ineffectiveness of sanatorium treatment at Aysgarth, and go on to suggest that, as far as the chronic consumptive is concerned, residence in a sanatorium is not necessarily even the best form of treatment. It would be highly unfortunate if these observations should unwittingly foster the idea that sanatorium treatment has been a failure.

In the first place, such figures as Dr. Dunbar's are quite meaningless in the absence of various data—e.g., methods of selection, milieu, duration of treatment, &c., while, even if they were quite beyond criticism, it would be extremely unfair to saddle the sanatorium with blame which could more justly be imputed to after-conditions. Without any desire to exaggerate the rôle of the sanatorium or to belittle that of the dispensaries, I should like to lay emphasis on the fact that for *all* forms of phthisis the one is quite as essential as the other. It is probably true that, as modern research suggests, many latent-active cases would get well of themselves without either sanatorium or dispensary treatment (particularly the so-called abortive cases described by Bard); but it is equally true that for all cases existing on lower planes of resistance than these sanatorium treatment for at least one period, if not for several distinct periods, is absolutely essential. Moreover, in laying emphasis on the prohibitive cost of housing, even for a time, the chronic consumptive, one is apt to ignore the direct return to the State in the form of increased working capacity over astonishingly long periods, to say nothing of educative value, opportunities for administering tuberculin under observation, &c. It is not suggested by Dr. Dunbar that dispensary methods would have increased his percentage of permanent cures; and there are few public authorities would have the courage to pursue the reactionary course

of excluding chronic cases from sanatorium treatment even if the 5 per cent. for whom (according to Dr. Dunbar) a cure could be predicted would be found prepared to acquiesce in their exclusion. Finally, where there is a proper organisation of sanatorium, dispensary, and hospital treatment, together with an efficient system of examination and diagnosis (as, for instance, in Birmingham, where the tuberculosis scheme is probably a model), it will be found that the after-history records of chronic consumptives treated in sanatoria are infinitely better than those quoted by Dr. Dunbar.

If one might suggest any alterations in the present system the existing control by Insurance Committees should be abolished in favour of organisation by health departments, and the inefficient and often entirely mythical system of domiciliary treatment should be swept away; in place of the latter the dispensary system should be amplified by the appointment of a visiting staff, and institutions should be multiplied which would be available for the proper diagnosis of undetermined cases. To contemplate running tuberculosis schemes mainly on a dispensary system is, in a sense, to put the cart before the horse, if not actually to decapitate that useful animal.

I am, Sir, yours faithfully,

EDWARD G. GLOVER, M.D. Glasg.,

Medical Superintendent, Salterley Grange Sanatorium,  
Feb. 17th, 1917.

### PNEUMATIC TOURNIQUETS.

To the Editor of THE LANCET.

SIR.—The recent letters on this subject would suggest that pneumatic tourniquets are something new, whereas they have been used extensively for several years. In THE LANCET of Jan. 25th, 1913, I illustrated a pneumatic tourniquet which I had used for several months and therein described its uses, its advantages, and some practical points which I had learnt in employing it. I have seen no reason to have it altered from the original model, and the makers, Messrs. Montague, 69, New Bond-street, tell me they have sold a large number, and receive frequently inquiries about them.

I am, Sir, yours faithfully,

R. H. JOCELYN SWAN, M.S. Lond., F.R.C.S. Eng.,

Major, R.A.M.C.; Senior Surgeon, Royal Herbert Hospital, Woolwich, &c.  
Wimpole-street, W., Feb. 17th, 1917.

### THE DRESSING OF BURNS WITH PARAFFIN WAX.

To the Editor of THE LANCET.

SIR.—In an annotation under the above heading in your issue of Feb. 17th the use of Dr. Barthe de Sandfort's "ambrine" is mentioned as being applied for use in the Navy by the instructions of Sir Arthur May.

It is stated that: "As, however, the preparation is a secret one controlled by a company in Paris, the treatment is not as readily accessible as some of our correspondents desire."

"Ambrane" is composed of specially prepared paraffin wax with 5 per cent. of oleum succini, and will now be readily obtainable, the representation for Great Britain, &c., being in the hands of—Yours faithfully,

THE ANGLO-FRENCH DRUG CO., LTD.

Gamage Buildings, Holborn, London, E.C., Feb. 17th, 1917.

**DONATIONS AND BEQUESTS.**—By will the late Mr. Edward Hinkley, of Southport, bequeathed £1000 each to the Southport and Birkdale District Nursing Society, the Leicester Infirmary, Southport Infirmary, £500 each to the Southport Children's Sanatorium, Leicester Institute for the Blind, Leicester Institute for the Deaf and Dumb, Southport Institute for the Deaf and Dumb, and the Homoeopathic Dispensary, Southport.—The late Mr. J. Holmes, of Bradford, left £500 to the Bradford Royal Infirmary and the residue of his estate to the Bradford Eye and Ear Hospital and the Bradford Children's Hospital.—By the will of the late Mr. Alfred Ewin, of Southend, the testator has bequeathed £1000 each to the City of London Hospital, Victoria Park, and the Queen Alexandra Hospital, Hackney-road; £600 to the Southend Victoria Hospital and Nursing Home for a "Ewin" bed, and £300 for a children's cot to be called after him, and £200 to the Adelaide Dispensary, Bethnal Green.

### Medical News.

UNIVERSITY OF BRISTOL.—At examinations held recently the following candidates were successful:

FINAL EXAMINATION FOR THE DEGREES OF M.B., CH.B.

Part I. only.—Daniel Gingell Cosham.

DIPLOMA IN PUBLIC HEALTH.

Pass.—James Francis Blackett.

Part II., completing examination.—John Maurice Harper.

Part I. only.—Isaac Bernard Barclay.

HEALTH INSURANCE FINANCE IN LONDON.—A deputation from the London Insurance Committee was recently received by Sir Edwin Cornwall, M.P., chairman of the National Health Insurance Joint Committee, which laid before him the financial position of National Insurance in London in plain terms. The carrying out of the work of the London Insurance Committee upon the allowance made by the Treasury was stated to be impossible, the deficit was fixed at £20,000, and the probability of a levy having to be made upon the insured population of the County of London, if no further support from the Government should be forthcoming, was spoken of. Sir Edward Smith, the spokesman of the deputation, added that public men were not prepared to give up their time to the administration of National Insurance unless the money necessary for their purpose was forthcoming, and that those associated with him would prefer to resign their positions rather than continue attempting the work assigned to them upon an insufficient income. Sir Edwin Cornwall accorded a sympathetic reply and spoke of the request made, as being reasonable.

ROYAL MEDICAL BENEVOLENT FUND GUILD.—The annual meeting of the Guild was held on Feb. 16th at 11, Chandos-street, W., when Lady Tweedy presided and read the report of Council for the preceding year. The report of the Father Christmas branch was read by Miss Gladys Edwards, honorary treasurer. The sub-reports of the Case Committee and the Clothes Committee were read by the respective chairmen, Mrs. Liveing and Mrs. Furnival. In the unavoidable absence of the honorary treasurer, Mrs. Scharlieb, Lady Fripp submitted the financial statement. Dowager Lady Broadbent's resignation of the presidency of the Guild was accepted, and the nomination of Lady Bradford as President was confirmed. The need of new secretaries was emphasised by Lady Tweedy's statement that the Guild received applications for help from such widely scattered districts as the Shetland Isles, Wales, and Cornwall. She was glad to say that with the increase of applicants pleading for help the charity was also increasingly supported, and in two cases the Guild was benefited by gifts from the trustees of funds left for charitable purposes. This marks the beginning of an important source of help.

CENTRAL MIDWIVES BOARD.—A meeting of the Central Midwives Board was held at Queen Anne's Gate Buildings, Westminster, on Feb. 15th, with Sir Francis H. Champneys in the chair.—Further correspondence was considered with reference to a candidate for examination who was stated by the approved midwife in whose house she was residing to have taken a variety of drugs and stimulants during the week preceding an examination, and in particular during the morning of the first day of the examination. The Board directed that the statement of the candidate be referred for comment to the approved midwife in whose house the taking of drugs and stimulants is alleged to have occurred.—Further correspondence was considered with reference to a candidate for examination who had tendered a certificate of birth which had been falsified. The Board decided that the candidate having now furnished the Board with an explanation of the circumstances attending the falsification of her birth certificate, and having tendered a fresh and unaltered birth certificate, be admitted to examination.—A letter was considered from the Acting Registrar of the General Medical Council conveying the request of the President that the Board would forward to the local supervising authorities (a) a copy of a circular letter addressed by the Council to all the registered medical practitioners in England and Wales, calling their attention to the provisions of the Midwives Act, 1902, which prohibit any women not being certified under the Act from attending women in childbirth habitually and for gain otherwise than under the direction of a qualified medical practitioner; (b) a copy of a warning notice issued by the Council, pointing out that any registered medical practitioner proved to have been guilty of "covering" an uncertified woman will be liable to have his name erased from the Medical Register. The secretary reported that the Local Government Board have expressed a desire to forward from their office the circular letter and the warning notice to the various local supervising authorities, and that the General Medical Council have

agreed to this being done. It was decided that the Central Midwives Board has no objection to the Local Government Board distributing the circular letter and warning notice of the General Medical Council as suggested by the Local Government Board.—A letter was considered reporting the conviction of an uncertified woman for a breach of Section 1 (2) of the Midwives Act, 1902, and requesting the Board to consider the conduct and action in connexion with this case of a medical practitioner. The Board resolved that the papers in the case be forwarded to the General Medical Council with a request that they will take such action in the matter as may seem fit to them, and that if so desired the Board will undertake to appear as prosecutors in the case.—A letter was also considered reporting the prosecution of an uncertified woman for a breach of Section 1 (2) of the Midwives Act, 1902, and of a registered medical practitioner for aiding and abetting her, and requesting the Board to consider his conduct and action in connexion with the case.

**CENTENARIAN.**—Mrs. Mary Ann Brooks celebrated the 101st anniversary of her birthday at King's Lynn on Feb. 19th.

**THE annual meeting of the Mental After-Care Association** will be held at the house of Sir Robert Armstrong-Jones, 9, Bramham-gardens, South Kensington, London, S.W., the Lord Mayor of London presiding. The meeting is open to all interested.

## Parliamentary Intelligence.

### NOTES ON CURRENT TOPICS.

#### *Criminal Law Amendment Bill.*

**THE Criminal Law Amendment Bill**, which has been introduced in the House of Commons by the Home Secretary "to make further provision with respect to the punishment of sexual offences and the prevention of indecent advertisements and matters connected therewith," has been printed. It was read a second time on Monday, Feb. 19th. The Bill, which is an important one, makes it an offence to communicate knowingly venereal disease, extends the Indecent Advertisements Act with a view to suppress the advertisement of the "quack" treatment of venereal diseases, and imposes increased penalties for the offences of soliciting and the maintenance of houses of ill-fame.

Clause 1 deals with the punishment of acts of indecency with girls under 16. It runs:—

(1) Any male person of the age of 16 years or over who commits an act of indecency with a girl under the age of 16 years shall be liable on conviction on indictment to imprisonment with or without hard labour for a term not exceeding two years, or on summary conviction to imprisonment with or without hard labour for a term not exceeding six months; and it shall be no defence to a charge under this section to prove that the girl consented to the act of indecency.

(2) No prosecution shall be commenced for an offence under this section more than six months after the commission of the offence.

(3) If upon the trial of any indictment for rape or for an indecent assault, or for an offence under sections 4 or 5 of the Criminal Law Amendment Act, 1885 (in this Act referred to as the principal A.), or under the Punishment of Incest Act, 1908, the jury are not satisfied that the defendant is guilty of the offence charged but are satisfied that he is guilty of an offence under this section, they may acquit the defendant of the offence charged and find him guilty of an offence under this section. In every such case the defendant shall be liable to be punished as if he had been convicted upon an indictment for the offence of which he is so found guilty.

#### *Communication of Venereal Disease.*

Clause 2 imposes a penalty on a person suffering from venereal disease who has sexual intercourse with another person. Its terms are:—

(1) A person who is suffering from venereal disease in a communicable form shall not have sexual intercourse with any other person or invite any other person to have such sexual intercourse.

(2) If any person acts in contravention of this section, that person shall be liable on conviction on indictment to imprisonment with or without hard labour for a term not exceeding two years, or on summary conviction to imprisonment with or without hard labour for a term not exceeding six months. Provided that a person shall not be convicted under this section if that person proves that he or she had reasonable grounds to believe that he or she was free from venereal disease at the time the alleged offence was committed.

(3) Where any person is convicted of any of the offences mentioned in the Schedule to this Act [these are offences against this measure and certain specified offences against the person] the court may, if they think fit, for the purpose of ascertaining whether that person is suffering from venereal disease in a communicable form order that person to submit to such medical examination and tests as may be requisite for that purpose. If the person is a female, the examination and tests shall be conducted, if she so desires, by a female doctor.

(4) Where a person has within three months before the commission of any alleged offence under this section received a written notice, either on an examination ordered under this section or while under compulsory detention in any prison or other institution, from a duly qualified medical practitioner that he or she is suffering from venereal disease in a communicable form that person shall be deemed to have

been so suffering at the time when the alleged offence was committed, unless the contrary is proved.

(5) An offence under this section shall be deemed to be an offence to which Section 29 of the Larceny Act, 1916 (which relates to the demanding of money, &c., with menaces), applies.

(6) In this section the expression "venereal disease" means syphilis, gonorrhœa, or soft chancre, or any disease of the genito-urinary organs which may reasonably be suspected to be venereal disease.

Clause 3 lays down that cause to believe that a girl was of or above the age of 16 shall not be a defence to a charge under Sections 5 or 6 of the Criminal Law Amendment Act. Clauses 4 and 5 relate to proposals to increase penalties for keeping brothels, and Clause 6 amends the penalty for soliciting or loitering for the purposes of prostitution.

#### *Indecent Advertisements.*

Clause 7 extends the Indecent Advertisements Act and is in the following terms:—

(1) The Indecent Advertisements Act, 1889, shall be extended as follows: (a) A person who publishes by way of advertisement, or causes to be published, any picture or printed or written matter which is of an indecent or obscene nature, shall be guilty of an offence under Section 3 of that Act and punishable accordingly; (b) a person who gives or delivers to any other person any such picture or printed matter or written matter with intent that the same should be published by way of advertisement, shall be guilty of an offence under Section 4 of that Act and punishable accordingly; (c) the maximum penalties under Sections 3 and 4 of that Act shall be £100, and six months' imprisonment instead of 40s. and one month's imprisonment and £5 and three months' imprisonment respectively, and those sections shall have effect accordingly; (d) The following section shall be substituted for Section 5:—"Any advertisement relating to syphilis, gonorrhœa, nervous debility, or other complaint or infirmity arising from or relating to sexual intercourse, and any advertisement which suggests directly or indirectly, the use or taking of any appliance, drug, substance, or thing, for the purpose of procuring miscarriage or abortion, or which suggests, directly or indirectly, that any premises are or can be used for immoral purposes, shall be deemed to be printed or written matter of an indecent nature within the meaning of Section 3 of this Act."

(2) Nothing in the Indecent Advertisements Act, 1889, as amended by this Act shall apply to any advertisement by any local or public authority, or to any advertisement published in any *bond-fide* medical or pharmaceutical publication or pharmaceutical trade list; and a person charged under that Act as so amended with publishing an advertisement, if he is not himself the advertiser, shall not be convicted if he proves that he did not know, and had no reasonable ground for suspecting, that the advertisement was of such a character as to make the publication thereof an offence.

The remaining clauses deal with procedure and with the application of the measure to Scotland and Ireland.

#### *The Second Reading.*

The HOME SECRETARY, in moving the second reading of the Bill, said that a strong case existed for such a measure. The evils which were aimed at were patent to all, and the need for a remedy was urgent. He was quite ready to think that this country was no worse than, and, indeed, it might be better than, many other countries. He had aimed at confining the measure to proposals which would receive general assent and would, he hoped, be quickly passed into law. The right honourable gentleman proceeded to explain the terms of the Bill. With reference to Clause 2, which dealt with the subject of venereal diseases, he believed that matter was of real importance to the future of the race, and by the admirable report of the Royal Commission on Venereal Disease it had been brought into the region where action might be taken. Of the many recommendations of that Commission perhaps the most important dealt with questions of diagnosis and of treatment, and with the provision of institutions assisted by the local authorities. These matters were in the province of the Local Government Board, which had taken vigorous action in that direction. The suggestion that unqualified practice should be restricted was closely allied with the question of treatment. That subject was not a matter for the Home Office, but it was being considered by the President of the Local Government Board with a view to legislation along that line. There remained matters which must be dealt with, if at all, by amendments of the criminal law, and after consultation with the President of the Local Government Board and his advisers he had included in the Bill two provisions relating to venereal disease. One of these provided that "a person who is suffering from venereal disease in a communicable form shall not have sexual intercourse with any other person or invite any other person to have such sexual intercourse." He thought that a person of either sex who had the misfortune to suffer from one of these terribly contagious complaints ought not to be allowed to act so that the disease was likely to be communicated to others and perhaps passed on to future generations. Therefore he proposed to make that in itself an offence. When this disease was so terribly contagious its communication ought to be prevented. He was conscious that there might be difficulties in bringing the offence home to those who were guilty of it. Special provisions had been inserted which would operate in certain cases. It was provided that a person convicted of certain offences which were of a sexual character might be examined by a medical man in order to ascertain whether he

or she was suffering from one of these diseases. The doctor in the case of a female prisoner would, if desired, be a female doctor. Then the doctor who made the examination might, if the person was suffering from venereal disease, give a written notice to that effect, so that the person could not afterwards say that he or she had had no notice of the disease. He did not think that anyone could complain of an arrangement of that kind. The other matter relating to venereal disease was contained in Clause 7, which dealt with the Indecent Advertisements Act, 1889. That Act provided that advertisements for the cure of venereal diseases should be deemed indecent, but it omitted to deal with advertisements in newspapers. It was proposed to extend the Act to advertisements in newspapers. It was also desired to extend it to advertisements of means for procuring abortion, or suggesting that premises could be used for immoral purposes.

Mr. HERBERT SAMUEL (the late Home Secretary) said that he was convinced that the Bill would do much to mitigate the havoc which was wrought by venereal diseases and the scandals of child prostitution. He observed that he was not in favour of the compulsory notification of venereal disease. It was strange that the law had not hitherto made it an offence for a person with full knowledge of his condition to infect another person with venereal disease.

In the course of the subsequent debate Sir HENRY CRAIK insisted on the urgency of the measure. Several Members criticised some of the provisions in the Bill, which was read a second time. It will be considered in Committee of the whole House.

#### HOUSE OF COMMONS.

WEDNESDAY, FEB. 14TH.

##### *Operations on Soldiers.*

Mr. KING asked the Under Secretary for War whether orders had been given to surgeons of London hospitals not to undertake any operations on soldiers under their charge for diseases originating before they were wounded if the treatment of such cases would delay them from rejoining any longer than would be necessary for recovery from their wounds.—Mr. MACPHERSON answered: The criterion in this matter is fitness for military service, and no instructions have been issued to prevent surgeons performing operations which are necessary for the cure of any disability which unfit a man for military service.

##### *Medical Men's Cars and the Speed Limit.*

Mr. CHANCELLOR asked the Home Secretary whether, in view of the shortage of doctors which now necessitated their journeying considerable distances to visit patients, he would consider the advisability of the speed limits for motor-cars being waived so as to reduce the time spent en route; and whether, in view of the restricted lighting and the difficulties of transit at night, in order to facilitate doctors when visiting urgent cases, they might be permitted to use unobscured headlights on their motor-cars.—Sir G. CAVE wrote in reply: I have no authority to waive the speed limit for motor-cars. In framing the orders as to lights on vehicles, special regard has been paid to the requirements of doctors and others who have occasion to travel by road at night. The orders now in force allow the use of sufficient light for safe driving at ordinary speed, and I do not see my way to authorise the use of unrestricted headlights as the honourable Member suggests.

THURSDAY, FEB. 15TH.

##### *Hospital Accommodation in Mesopotamia.*

Answering Sir J. JARDINE, Mr. MACPHERSON said that the situation as to supplies and transport in Mesopotamia was now satisfactory. Hospital accommodation was being provided at Nasiriyah, and as soon as it was ready nurses would no doubt be sent there.

MONDAY, FEB. 19TH.

##### *Medical Treatment of Soldiers' Widows.*

In answer to Mr. MURRAY MACDONALD, Mr. BARNES (Minister of Pensions) wrote: Resolutions have been received from several Insurance Committees suggesting that public provision should be made for the medical treatment of widows and orphans of sailors and soldiers through the medium of the committees. The matter is receiving very careful consideration.

##### *Discharged Soldiers and Tuberculosis Treatment.*

Sir E. CORNWALL (representing the Insurance Commission), in reply to Mr. HOGGE, said: Under special arrangements made by the various Insurance Commissioners with the Admiralty and the War Office beds have been provided for nearly 5000 discharged soldiers and sailors suffering from tuberculosis. Insurance Committees have, in addition, provided beds in the ordinary arrangement for a considerable number of discharged men, but I have no information as to the exact number.

##### *Derbyshire Insurance Committee.*

Mr. THOMAS RICHARDSON asked the Representative of the National Insurance Commissioners whether his attention had been called to the fact that the Derbyshire Insurance Committee proposed to charge the practitioners concerned with the estimated cost of medical service subcommittee inquiries; and whether he would take the necessary steps to prevent the Derbyshire or any other Insurance Committee from taking such action, which was giving rise in the medical profession to dissatisfaction with the administration of medical benefit.—Sir E. CORNWALL replied: My attention has not been drawn to the matter to which my honourable friend refers, but in the event of any dispute arising between Insurance Committees and the practitioners the latter have the right of appeal to the Commissioners, who would thereupon deal with the question.

TUESDAY, FEB. 20TH.

##### *"Manipulative" Surgery.*

Mr. MACVEAGH asked the Under Secretary for War whether the War Office was willing to appoint immediately a committee composed of men of high attainments but not connected with the medical profession, in order to inquire into the question of utilising for the alleviation of the sufferings of wounded soldiers the services of experts in manipulative surgery who did not hold medical degrees.—Mr. MACPHERSON replied: No, sir.

Mr. MACVEAGH: Why do the War Office object to the appointment of an independent committee?—Mr. MACPHERSON: It is a very doubtful proposition to suggest that non-technical men should be put to deal with a technical subject.

Mr. SWIFT MACNEILL: Are the Government prepared to allow men to suffer in the interest of professional trades unionism?—Mr. MACPHERSON: I must protest against that. Nothing can be more admirable during the whole course of the war than the skill, judgment, and effectiveness displayed by the medical profession.

Sir WILLIAM COLLINS: Whilst not excluding the investigation of any line of treatment from whatever source it may be suggested, will the honourable gentleman have regard to the risks as well as the advantages of uncertified practitioners?—Mr. MACPHERSON: Certainly.

In reply to two questions as to treatment in two instances, Mr. MACPHERSON said that he had no information on them.

Mr. MACVEAGH asked whether the honourable gentleman was aware that the medical profession in France was availing itself of the services of experts in manipulative surgery for the treatment of wounded soldiers; and whether he could state on what grounds the War Office in this country refused to allow a similar dilution of labour.—Mr. MACPHERSON answered: I have no information on the first part of the question. In regard to the second part of the question, apart from other objections, it is the case that under the terms of the Medical Act, 1858, it is not possible to employ as surgeons in the military service any person not registered under that Act.

Mr. MACVEAGH asked whether the honourable gentleman was aware of the statement that manipulative surgery was being used in France.—Mr. MACPHERSON: It would be much better that these things should be discussed in debate rather than by question and answer. I can tell the honourable Member that not only have we the finest doctors and surgeons, but we have also the finest hospitals where the men are treated.

#### BOOKS, ETC., RECEIVED.

ALLEN, GEORGE, AND UNWIN, London.

Your Part in Poverty. By George Lansbury. 1s. net.

CLARIDGE AND CO., G., Bombay.

Indian Manual of First Aid. By Colonel R. J. Blackham, C.I.E., A.M.S. Sixteenth edition. Rs.1-4.

DENNY, A. AND F., 147, Strand, London.

Dreams: What They Are and What They Mean, Including a Section on Psycho-Analysis or the New Meaning of Dreams. By J. W. Wickwar. 1s. net.

KING, P. S., AND SON, London.

Prostitution—Moral Bearings of the Problem. By M. P. With a Chapter on Venereal Disease by J. P. (formerly Resident Medical Officer, London Lock Hospital). 1s. net.

MASSON ET FILS, Paris.

Les Blessures des Vaisseaux. Par L. Senoert, Professor agrégé à la Faculté de Médecine de Nancy. 4 fr.

Le Traitement des Plaies Infectées. Par A. Carrel et G. Dehelly. 4 fr.

Dysenteries: Choléra Asiatique et Typhus Exanthématique. Par H. Vincent, Médecin Inspecteur de l'Armée, Membre de l'Académie de Médecine; et L. Muratet, Chef des Travaux à la Faculté de Médecine de Bordeaux. 4 fr.

## Appointments.

*Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

- HUTTON, A., M.B., Ch.B., Aberd., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Wartie District of the County of Aberdeen.  
 LEITCH, A., M.D., R.U.I., Medical Officer and Medical Officer of Health to the Castlederg Dispensary District, County Tyrone, pro tem.  
 STYAN, T. G., M.D. Cantab., Temporary Medical Officer of Health for Bamsgate.  
 TOBIN, R. F., F.R.C.S. Irel., Inspector for Ireland under the Vivisection Act.

ST. THOMAS'S HOSPITAL.—Casualty Officers and Resident Anesthetists: BLAMPIED, H. J., M.R.C.S., L.R.C.P., CHURCHER, D. G., M.R.C.S., L.R.C.P., ORME, E. S., B.A., M.R.C.S., L.R.C.P., and WARE, S. A. T., M.R.C.S., L.R.C.P. Resident House Physicians: BESWICK, W. T., B.A. Cantab., MAVROGORDATO, A., M.A. Oxon., M.R.C.S., L.R.C.P., MILES, M. W. H., M.R.C.S., L.R.C.P., and WOOLRICH, W. G., B.A. Cantab. Resident House Surgeons: MOORE, L. C., JENNINGS, H. C., M.R.C.S., L.R.C.P., BOYFIELD, G. W. J., and SAI, P., M.R.C.S., L.R.C.P. House Surgeon to Block 8: BLUETT, D. C., M.R.C.S., L.R.C.P. Obstetric House Physician: HARRIS, J. R., M.R.C.S., L.R.C.P. Ophthalmic House Surgeon: MARRIOTT, W. Clinical Assistants: DAVIS, F. G. S., and CIEH, Y. J., M.R.C.S., L.R.C.P.

## Vacancies.

*For further information regarding each vacancy reference should be made to the advertisement (see Index). When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor:*

APPLECROSS, PARISH OF, ROSS-SHIRE.—Medical Officer, &c., for Torridon District. Estimated emoluments £350 per annum.  
 ASHTON-UNDER-LYME, LANCS., DISTRICT INFIRMARY AND CHILDREN'S HOSPITAL.—Assistant House Surgeon. Salary £160 per annum, with usual emoluments.  
 BATH, EASTERN DISPENSARY.—Resident Medical Officer. Salary £140 per annum, with furnished rooms, &c.  
 BIRKENHEAD UNION INFIRMARY.—Junior Female Resident Assistant Medical Officer. Salary at rate of £300 per annum, with board, &c.  
 BIRMINGHAM GENERAL DISPENSARY.—Resident Medical Officer, unmarried. Salary £250 per annum, with furnished rooms, &c.  
 BIRMINGHAM AND MIDLAND HOSPITAL.—Female House Surgeon. Salary £200 per annum.  
 BRISTOL ROYAL INFIRMARY.—House Physician and House Surgeon. Salary at rate of £120 per annum, with board, &c.  
 BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.

CARDIFF, KING EDWARD VII'S.—Two House Surgeons for six months. Salary at rate of £175 per annum, with board, &c.  
 DERBYSHIRE, DEVONSHIRE HOSPITAL, BUXTON.—Assistant House Physician. Salary £100 per annum, with board, &c.  
 DUNDEE DISTRICT ASYLUM.—Assistant Resident Medical Officer. Salary £300 per annum, with board, &c.  
 DUNDEE MATERNITY AND CHILD WELFARE SCHEME.—Medical Practitioner (Female). Salary £350 per annum.  
 EVELINA HOSPITAL FOR CHILDREN, Southwark, S.E.—House Physician. Salary at rate of £160 per annum, with board, &c.  
 FAREHAM, HANTS COUNTY ASYLUM.—Temporary Assistant Medical Officer. Salary 6 guineas a week, with board, &c.  
 GREAT YARMOUTH HOSPITAL.—House Surgeon, unmarried. Salary £200 per annum, with board, &c.  
 GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon. Salary £200 per annum, with board, &c.  
 HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.—House Surgeon and Assistant Casualty Medical Officer. Salary at rate of £50 per annum, with board, &c.  
 LONDON COUNTY COUNCIL.—Two Female Medical Inspectors (unmarried or widows) in the Public Health Department. Salary £300 a year.

MAIDSTONE, WEST KENT GENERAL HOSPITAL.—Senior House Surgeon. Salary £250 to £300 per annum.  
 MANCHESTER, ABERGELLE SANATORIUM.—Temporary Medical Superintendent. Salary £300 per annum, &c.  
 MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Park-place, Cheetham Hill-road.—Female House Surgeon. Salary £120 per annum, with board, &c.  
 NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, Bloomsbury.—Junior House Physician. Salary £150 per annum, with board, &c.  
 PORTSMOUTH ROYAL HOSPITAL.—House Surgeon for six months. Salary £250 per annum, with board, &c.  
 PRIVATE FIRST LINE MILITARY HOSPITAL, near London.—Senior Lady House Surgeon. Salary £300 per annum, with board, &c.  
 QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford.—House Surgeon.  
 ROYAL LONDON OPHTHALMIC HOSPITAL, City-road, E.C.—Third House Surgeon. Salary at rate of £50 per annum, with board, &c.  
 SOUTHAMPTON, ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL.—House Physician and Junior House Surgeon. Salaries £150 and £120 per annum respectively, with board, &c.  
 SUSSEX HILL ROYAL INFIRMARY.—Female House Surgeons. Salaries—Senior, £250; Junior, £200 per annum, with board, &c.

VICTORIA HOSPITAL FOR CHILDREN, Tite-street, Chelsea, S.W.—Senior Resident Medical Officer. Salary £250 per annum, with board, &c.

WEST-END HOSPITAL FOR NERVOUS DISEASES, 73, Welbeck-street, W.—House Physician. Salary £250 per annum, with board, &c.  
 WEST HAM UNION SICK HOME, 95, Forest-lane, Forest Gate, E.—Resident Assistant Medical Officer. Salary £300 per annum, &c.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Morriston, Woodstock, Wansford, Helston, and Clonakilty.

## Births, Marriages, and Deaths.

### BIRTHS.

BUNBURY.—On Feb. 14th, at "Moorlands," Mullion, the wife of E. G. Bunbury, M.R.C.S., L.R.C.P., of a daughter.

HEWITT.—On Feb. 11th, at Nottingham-place, W., the wife of Lieutenant R. C. Hewitt, R.A.M.C., of a daughter.

HUGHES.—On Feb. 13th, at Barnsley Hall, Bromsgrove, Worcester-shire, to Dr. and Mrs. Percy T. Hughes—a son.

KIRKNESS.—On Feb. 10th, at The King's Service Home, Sonthea, the wife of W. R. Kirkness, M.R.C.S., L.R.C.P., "Montrose," Portsmouth, of a daughter.

MCMULLEN.—On Feb. 13th, at Temple-avenue, Golders-green, the wife of W. Halliburton McMullen, F.R.C.S., of a son.

WILLIAMSON.—On Feb. 19th, at "Kingamoor," Sutton, Surrey, to Surgeon David J. Williamson, M.D., R.N.V.R., and Mrs. Williamson (*née* Joan Bonford)—a son.

### MARRIAGES.

BUCKLEY—BRINDEJONT.—On Feb. 17th, at the Church of St. Ferdinand des Ver. es, Paris, Captain Leonard Buckley, R.A.M.C., to Suzanne, only daughter of Prosper Brin de Jont, of Paris.

CRESSY—GRIESBACH.—On Feb. 19th, at the Parish Church, Alderton (Glos.), Charles James Cressy, M.R.C.S., L.R.C.P., to Julia, daughter of the late Sydney Griesbach, M.R.C.S., L.R.C.P., of Garforth, Leeds.

DE NYSEN—EDWARDS.—On Feb. 15th, at the Parish Church, Haleworth, P. J. de NySEN, M.R.C.S. Eng., L.R.C.P. Lond., to Rose Edwards, of Holton Lodge, third daughter of the late John Cooper Forster, President of the Royal College of Surgeons.

MC CALL—PRITCHARD.—On Feb. 17th, at the Church of "Our Lady Help of Christians," Blackheath, Henry Dundas McCall, M.R.C.S., L.R.C.P., R.A.M.C., to Margaret Ruth Mary, third daughter of Mr. and Mrs. W. R. Pritchard, Glenwood, Lee.

TREHERNE—BURPEE.—On Feb. 14th, at the Parish Church, Weybridge, Captain C. W. Treherne, R.A.M.C., to Marjorie, youngest daughter of Mr. and Mrs. F. Burpee, of Vancouver, B.C.

WATSON—TEEVAN.—On Feb. 1st, at St. James's, Spanish-place, W., Colonel C. Gordon Watson, C.M.G., F.R.C.S., of 82, Harley-street, to Geraldine, daughter of the late Charles James Teevan, of Woodside Court, Croydon.

### DEATHS.

CURRIE.—On Feb. 16th, at Trinity Hall, Bungay, John Legge Currie, L.R.C.P. Lond., M.R.C.S.

FRANKLIN.—On Feb. 17th, at Westhay, East Sheen, suddenly, Surgeon-General Sir Benjamin Franklin, K.C.I.E., K.H.P., aged 72 years.

JESSOP.—On Feb. 18th, at Harley-street, of pneumonia. Walter Hamilton Hilton Jessop, M.A., M.B. Cantab., F.R.C.S., J.P., ophthalmic surgeon to St. Bartholomew's Hospital, and President of the Ophthalmological Society of the United Kingdom, in his 64th year.

LAWSON.—On Feb. 18th, at Ventnor Villas, Hove, Sussex, formerly of Holme House, Hebburn Bridge, Yorks, Joseph Lawson, B.A., M.B., T.C.D., aged 70 years.

ROXBURGH.—On Feb. 16th, suddenly, of angina pectoris, Robert Roxburgh, M.B., F.R.C.S.E., honorary physician to the Weston-super-Mare Hospital, and honorary consulting physician to the Royal West of England Sanatorium, aged 63 years.

WOODCOCK.—On Feb. 17th, at Nottingham-place, Louisa Woodcock, M.D., B.S. Lond., M.A. T.C.D., aged 51 years.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

### METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Feb. 21st, 1917.

Date.	Rain-fall.	Solar Radio in Vacuo.	Maxi- mum Temp. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Remarks.
Feb. 15	...	59	49	35	35	36	Overcast
" 16	...	50	43	30	31	31	Foggy
" 17	0·17	59	49	31	43	43	Raining
" 18	...	53	50	40	40	41	Overcast
" 19	0·05	53	45	39	40	40	Overcast
" 20	0·15	49	49	40	41	41	Raining
" 21	0·23	53	48	41	44	44	Overcast

Other information which we have been accustomed to give in these "Headings" is withheld for the period of the war.

## Notes, Short Comments, and Answers to Correspondents.

### MEDICAL MEN AND THE RIGHT TO REFUSE ATTENDANCE.

THE old question of the common-law medical rights of a medical practitioner to refuse to attend when summoned to visit a sick person without receiving a fee was raised at an inquest recently at York, when Dr. P. Schmidt was unjustly held by the jury to be "deserving of the severest censure in not carrying the case through." The medical man had received a fee for a previous attendance upon the deceased, a child of 6 months, but when sent for on the following day delayed going until the evening. He then recommended that the child should be taken to the county hospital, where the death took place a few minutes after the patient's admission. The fact that a second fee was not forthcoming was frankly admitted by the medical man to have been his reason for not attending when he was summoned. The report of the evidence given at the inquest by Dr. Schmidt justifies the surmise that a somewhat outspoken manner of asserting his right to ask for a fee and to refuse attendance in the absence of one may have prejudiced the medical man before the jury and may have been largely responsible for the censure passed upon him. The justice of such censure is not apparent. In refusing to attend in the absence of any prospect of remuneration a medical man exercises an undoubted right, which the public at large has recognised by instituting voluntary hospitals and dispensaries and Poor-law infirmaries for the benefit of those unable to pay for medical attendance. A medical man may, and very often does, attend poor patients without hope of reward, but the extent to which he does this is a matter which must be left to him to decide. One man having private means, or a remunerative practice, can afford to be generous in such matters where another cannot. A medical practitioner living in a poor neighbourhood would find a very large number of patients anxious to employ him and unable to pay him, if he once let it be known that his services were at the disposal of those so situated. In the same way a provision merchant in such a district who was ready to hand over his goods to those unable to pay for their purchases would soon have many customers. But neither the medical man nor the provision merchant would make a livelihood, and each has an equal right to endeavour to do so.

Probably if medical men asked the editors of their local daily and weekly papers to insert the above remarks, we would have a marked falling off in these very questionable censures by coroners and Poor-law juries.

### VITAL STATISTICS OF THE FEDERATED MALAY STATES AND THE STRAITS SETTLEMENTS.

Sir Edward Lewis Brookman, K.C.M.G., Chief Secretary to the Government of the Federated Malay States (Perak, Selangor, Negri Sembilan, and Pahang), in his report for the year 1915, just presented to Parliament, states that as the conditions relating to immigration and emigration have recently been abnormal the present population is probably considerably less than that shown by the census of 1911, viz., 1,172,336. The number of births in 1915 was 29,699 and of deaths 33,899. There were 5778 deaths of infants under one year of age and the infantile mortality rate was 194 per 1000. It is suggested by the Principal Medical Officer that without malaria the infantile death-rate would not be of great importance. The death-rate in the principal towns in 1915 was: Kuala Lumpur, 27.83 per 1000; Ipoh, 27.8 per 1000; Taiping, 33.99; and Seremban, 47.15. Malaria accounted for 44 per cent. of the total deaths. Dysentery and diarrhoea caused 3148 deaths, beri-beri 371, and pulmonary tuberculosis 1995. There was a severe outbreak of small-pox in the district of Lower Perak. Several cases also occurred in Selangor and Negri Sembilan, but only one case was reported in Pahang. Two cases of plague occurred in Perak. Venereal diseases show a distinct falling-off. The medical institutions maintained by the Government comprise 42 hospitals, 9 jail hospitals, 2 lunatic asylums, 3 leper asylums, and 15 out-door dispensaries. The number of in-patients treated during the year was 72,792 and of out-patients 204,997, both totals showing a remarkable decrease as compared with the previous year. The reports of the lady medical officers at Kuala Kangsar and Kuala Pilah show that they are doing much good work. Their services are greatly appreciated. Attempts have been made to get into touch with native midwives, but without much success. One of the lady medical officers observes that the large percentage of normal maternity cases among Malay women gives the midwives the appearance of skill which they do not possess;

and on the subject of infantile mortality she expresses the opinion that it is fever that more likely causes the high mortality than any errors in feeding.

On an estimated total population of 776,444 in the Straits Settlements, the birth-rate in 1915 was 29.25, and the death-rate 29.15 per 1000; for the European inhabitants, estimated at 8086, these ratios were 24.24 and 14.96 per 1000 respectively. The Principal Medical Officer, Dr. W. Gilmore Ellis, considers that on a different and more exact estimate of the population, according to the method of the medical officer of health of Singapore, the death-rate should be really 31.13 per 1000. The infantile mortality was 236.68 per 1000, being highest among Malays, who habitually feed their infants a few days old on boiled rice, which leads to indigestion and convulsions. Lectures on the subject are being given in the vernacular by Dr. Keun, which, it is hoped, may lead to improvement. There were 37 cases of plague (with 33 deaths) and 17 cases of cholera (with 10 deaths). Deaths from beri beri have decreased steadily from 2056 in 1911 to 1079 in 1915. At the Beri-beri Hospital, Pasir Panjang, all of the cases admitted had habitually eaten uncurled Siam rice; of the 135 discharged 9 were recovered and 113 considerably improved. At the Leper Asylum, Penang, with 411 inmates, more than 70 cases have been treated with injections of natin and Dr. Heiser's preparation of chaulmoogra oil; the results are being carefully watched, and in many instances considerable improvement (return of sensation, shrivelling up of nodules, disappearance of dermatitis) has been observed. There have been fewer admissions for ankylostomiasis (932) during 1915 than in either of the two years preceding, but owing to the paucity of health officers it has not been possible to make much progress in the eradication of the disease. Mr. Gilbert Brooke, chief health officer of Singapore, reports that the practical absence of infectious disease from all the great ports of the East is without parallel for several decades past; for five weeks from the beginning of September not a single port was in quarantine. No immigration was allowed during the first three months of the year, and for the next three months only limited immigration. Owing to the war the return pilgrimage season for Mecca had been accelerated into 1914, and no pilgrim sailings left the Straits at all for the 1915 season. A new quarantine and prevention of disease ordinance has been passed, including, among other improvements, the insistence on vaccination of unprotected immigrants from China and India, and discretionary powers for the detection and treatment of cases of infectious disease, and for their repatriation if necessary.

### KITCHENER CLUB FOR WOUNDED SOLDIERS.

THIS club for wounded soldiers has been started under theegis of the Red Cross at 8, Cambridge-gate, Regent's Park, London, N.W., and is open daily from 10 to 6. Reading and writing rooms are provided, and lunch and tea will be served free of charge.

### WOMEN SANITARY INSPECTORS AND HEALTH VISITORS' ASSOCIATION.

THE 1916-1917 handbook of the association, just issued, contains the names of the executive officers and members of committees, the rules of the association, an alphabetical list of members and associates, and the report for the session 1915-16. Several members are engaged on war service. The honorary secretary of the association is Miss O'Kell, 12, Buckingham-street, Strand, London, W.C.

### FOOD SUBSTITUTES IN GERMANY.

IT is probable that some difficulty is being experienced in those countries suffering from a shortage of food in administering the adulteration laws, inasmuch as mixtures are now allowed which were not allowed before. We have as examples in our own country the watering of spirits, the addition to wheat flour of other flours, and so forth. The opportunity, however, was sure to be one seized upon by the unscrupulous, and examples appear to have occurred in Germany of selling substitutes for the genuine article which can in no sense be regarded as supplying the necessary qualities of the comestibles so imitated.

In connexion with an exhibition of food substitutes a report has been issued by the Berlin Municipal Laboratory on the food adulterations which are at present so plentiful in Germany. It is stated that a large number of enterprising persons are devoting their time to the manufacture of food substitutes. Among these are the "bouillon cubes," which by law must contain at least 7½ per cent. of meat extract, but which actually consist of common salt together with a little colouring matter. "Powdered beef-tea," which is sold in attractive-looking small boxes, is composed of wheat-flour, common salt, a little clay, with a mere trace of meat extract. A "cheese substitute" in the form of a red powder contains 70 parts of common salt, 20 parts of powdered Hungarian pepper, a few grains of

aniseed, and some acid. Much-vaunted powders for making puddings contain coloured and flavoured potato flour, and are sold at 2s. 6d. per pound. There is even a substitute for pepper on the market. As the law has proved powerless against these fraudulent food articles, housewives in Berlin are urged to unite in self-defence.

#### EDIBLE SEAWEED.

*To the Editor of THE LANCET.*

SIR.—With reference to the note in THE LANCET of Feb. 10th under this heading respecting "laver," I think the following quotation from "A Popular History of British Seaweeds," by the Rev. D. Landsborough, A.L.S., in 1851, will prove interesting. He cites Professor W. H. Harvey, M.D., professor of botany, Dublin, in his large work "Phycologia Britannica," as saying of "laver":—

After many hours' boiling, the frond is reduced to a somewhat slimy pulp, of a dark brown colour, which is eaten with pepper and lemon-juice or vinegar, and has an agreeable flavour to those who have conquered the repugnance to taste it, which its great ugliness induces, and many persons are very fond of it. It might become a valuable article of diet, in the absence of other vegetables, to the crews of our whaling vessels sailing in high latitudes, where every marine rock at high-tide abundantly produces it. In its prepared state it may be preserved for an indefinite time in close tin vessels.

The Rev. D. Landsborough adds: "We regard this as a valuable hint," and, in his introduction to his own book, makes the following interesting statement:—

Even in our most common sea-wreck there are substances which may yet be turned to good account. One of these is mannite, the characteristic principle of manna, which my friend Dr. John Stenhouse has detected in many of our coarse seaweeds, but in greatest abundance in *Laminaria saccharina*, which we doubt not took its specific name from this circumstance. A quantity of this seaweed was by Dr. Stenhouse repeatedly digested with hot water, which formed with it a brownish, sweetish, mucilaginous solution. When evaporated to dryness on the water-bath it left a considerable quantity of a saline semi-crystalline mass; this was reduced to powder and treated with boiling alcohol, by which a considerable portion of it was dissolved. The alcoholic solution, on cooling, became nearly solid from the quantity of long transparent prismatic crystals with which it was filled. When purified by a second crystallisation these were deposited in large hard prisms of fine silky lustre. By analysis it was found that this was mannite. The quantity of mannite contained is very considerable: one thousand grains of the seaweed treated in the way described gave about 12 per cent. of mannite. It is very beautiful—as pure white as loaf-sugar, and almost as sweet. Since I wrote the above I have examined and tasted mannite which I got from Dr. Stenhouse about four years ago, and it is as white and sweet as ever. Surely some use may be made of this marine treasure.

I am, Sir, yours faithfully,

EAST ANGLIAN.

Feb. 20th, 1917.

THE Local Government Board last week increased the scales of allowances for the British-born wives of interned aliens. The maximum allowance for wives in London is now 12s. 6d. and outside London 10s., with the addition of 3s. in respect of each child.

P.N.—Standard works of reference give congenital dilatation of the colon as the disease first described by Hirschsprung of Copenhagen in 1880.

Nemo.—Magazines and illustrated papers are still in demand by the British Red Cross for the sick and wounded in hospitals, and should be sent to the Honorary Secretary, Red Cross War Library, Surrey House, Marble Arch, London, W.

COMMUNICATIONS not noticed in our present issue will receive attention in our next.

## Medical Diary for the ensuing Week.

### SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.  
MEETINGS OF SECTIONS.

Thursday, March 1st.

OBSTETRICS AND GYNAECOLOGY (Hon. Secretaries—H. Russell Andrews, T. G. Stevens): at 8 P.M.

*Specimens:*

Mr. J. P. Hedley: Uterus containing Carcinoma and Sarcoma.  
Dr. Herbert R. Spencer: Carcino-sarcoma Uteri.  
Dr. Cuthbert Lockyer: (1) Simultaneous Bilateral Tubal Pregnancy; (2) Secondary Neuro-epithelioma in the Ovary of a Child of Three.

*Short Communications:*

Dr. Hubert Roberts: (1) Curious Degeneration of a Cervical Fibroid; (2) Calcified Fibroid which caused Complete Torsion of the Uterus.

*Papers:*

Dr. H. W. Scripture: Two Cases of Psychic Dyspareunia treated by Mental Analysis.  
Dr. Herbert R. Spencer: (1) Four Cases of Undiagnosed Cancer of the Cervix in 200 Total Hysterectomies for Myoma (with six illustrations); (2) Two Cases of Supravaginal Amputation of the Uterus for Sarcoma mistaken for Myoma (two illustrations and four micro-photographs).

Dr. G. F. Blacker: Supravaginal Amputation of Uterus for Sarcoma mistaken for Myoma.

Friday, March 2nd.

LARYNGOLOGY (Hon. Secretaries—Cecil I. Graham, Frank A. Rose): at 4 P.M.

*Cases, &c.:*

Dr. Dundas Grant: (1) Laryngeal Stridor; (2) Nasopharyngeal Growth; (3) Fibromata of Vocal Cords.

Dr. Irwin Moore: (1) Lymphadenoma of Nasopharynx; (2) Bone Impacted in Oesophagus; (3) Pharyngeal Pouches.

Dr. G. W. Dawson: Four Cases.

Mr. Frank Taylor and Captain McKinstry: A Further Note on the Relationship between Vincent's Angina and Peri-dental Gingivitis.

N.B.—Members intending to show cases or specimens are reminded to send in particulars to the Senior Hon. Secretary at least 12 days before each meeting.

ROYAL SOCIETY OF ARTS, John-street, Adelphi, W.C.

WEDNESDAY.—4.30 P.M., Paper:—Mr. F. A. Hocking: The War and our Supply of Drugs.

HUNTERIAN SOCIETY, at the Royal Society of Medicine, 1, Wimpole-street, W.

WEDNESDAY.—9 P.M., Demonstration:—Dr. O. Leyton: The Differential Stethoscope.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY, West London Hospital, Hammersmith-road, W.

FRIDAY.—8.30 P.M., Meeting.

### LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East.

TUESDAY AND THURSDAY.—5 P.M., Milroy Lectures:—Dr. W. J. Howarth: Meat Inspection, with Special Reference to the Developments of Recent Years. (Lectures II. and III.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.

MONDAY AND WEDNESDAY.—5 P.M., Arris and Gale Lectures:—Dr. W. Harris: The Morphology of the Brachial Plexus in its Relation to Surgery.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simson: Gynaecological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

MENTAL AFTER CARE ASSOCIATION.

THURSDAY.—3 P.M., Annual Meeting at 9, Bramham-gardens, South Kensington, S.W.

ROYAL INSTITUTE OF PUBLIC HEALTH, Lecture Hall of the Institute, 37, Russell-square, W.C.

Course of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—

WEDNESDAY.—4 P.M., Lecture VII.:—Dr. W. G. Savage: The Protection of the Milk Supply. Prof. H. R. Kenwood, Prof. S. Delépine, Dr. C. Porter, and Mr. Wilfred Buckley have promised to take part in the discussion.

### EDITORIAL NOTICES.

It is most important that communications relating to the Editorial business of THE LANCET should be addressed exclusively "To the EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET should be addressed "To the Manager."

We cannot undertake to return MSS. not used.

Offices: 423, STRAND, LONDON, W.C.

## MANAGER'S NOTICES.

## VOLUMES AND CASES.

VOLUMES for the second half of the year 1916 are now ready. Bound in cloth, gilt lettered, price 16s., carriage extra.

Cases for binding the half-year's numbers (inland edition) are also ready. Cloth, gilt lettered, price 2s., by post 2s. 4d. To be obtained on application to the Manager, accompanied by remittance.

## ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the new year, the price was raised to 8d. The rates of subscription remain as revised in October.

## TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C., are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and not to THE LANCET Offices.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

## TO COLONIAL AND FOREIGN SUBSCRIBERS.

Subscribers abroad are particularly requested to note the rates of subscription given on page 4.

The Manager will be pleased to forward copies direct from the Offices to places abroad at the rates shown, whatever be the weight of any of the copies so supplied.

## Communications, Letters, &amp;c., have been received from—

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Hunterian Lectures  
ON THE  
INDIAN OPERATION OF COUCHING  
FOR CATARACT.

*Delivered before the Royal College of Surgeons of England  
on Feb. 19th and 21st, 1917,*

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PRELIMINARY.

MR. PRESIDENT AND GENTLEMEN.—The operation of couching for cataract is a very ancient one and its origin is lost in the dim mists of history. Celsus performed it and described his method at the commencement of the Christian era, and the silence of the ages has since been broken at intervals of centuries by other European workers and writers. It is, however, possible that this procedure was old in the East before its first mention in the West. In India, and in other Eastern countries as well, the profession of the cataract concher may almost be called a cult, whose art has passed down from father to son through countless generations. It is probable that the operation, as performed to-day in one of the Indian villages, is identical with that which might have been witnessed in the same district when our forefathers were naked savages. Only in a country ruled by tradition could such a state of affairs be possible. The advent of Europeans to India and the interest they took in all that concerned its peoples resulted in a close observation of the steps of the operation. This was to prove the first influence to break the settled monotonous calm it had enjoyed through the ages. As antiseptic surgery developed the progressive Western learnt to look with increasing horror on the crude and filthy methods of the concher, with the result that within the last few decades a vigorous literature on the subject has sprung up. The principal contributors have been Brockman, Exambaran, Hirschberg, Maynard, and Henry Smith. The lecturer has from time to time joined in the discussion, mainly from the clinical side, contributing first an analysis of 125 observed cases of the results of couching and later in 1910 of 550 such cases, in all of which very careful notes had been taken on printed schedules. To these he has since been enabled, by the kindness of Major H. Kirkpatrick, to add another 230, making the total 780. To the statistics thus obtained we shall return later.

THE TECHNIQUE OF THE OPERATION OF COUCHING.

It is important to state at the outset that there are two quite distinct operations performed by the Indian concher. For convenience sake the lecturer would suggest that we should speak of these respectively as "the anterior" and the "posterior," using the terms relatively to the plane of the ciliary body and iris.

*The anterior method*—A needle-like instrument, often a large hard thorn, with a very sharp point, is thrust suddenly through the cornea, and then onwards, either through the pupil or iris, into the periphery of the lens. No sooner is this movement complete than the next begins; using the corneal wound as fulcrum, the operator raises his end of the instrument and thereby depresses its point, which either lies on the surface of the lens or is embedded in its substance. This movement carries the lens backward and downward, and so clears the pupil. Great stress is laid on the immediate restoration of sight, and the operator departs in a blaze of glory, which dies down all too rapidly when sepsis begins to assert itself in the eye.

*The posterior operation* is a much more scientific procedure. Its first step is the making of an incision in the sclera just behind the ciliary body by means of a lancet (Fig. 1), guarded with cotton-wool to prevent its being introduced too far into the globe. Through the puncture thus made a copper probe, provided with a cotton stop, is introduced, and a circular movement is given to the point with the view of breaking through the fibres of the suspensory ligament. As soon as these have been torn through, the lens is depressed by a downward stroke of the point of the instrument, which is then withdrawn.

Such are the bare outlines of the two methods.  
No. 4879.

During the performance of a couching operation the surgeon and his patient squat upon their hams facing each other, in the immemorial fashion of the East, whilst an assistant, in the same attitude behind, holds and steadies the patient's head. (Fig. 2.) The subject is rich with detail, full of living interest, which links such incidents across the centuries with the stories of Bartimaeus and of the Pool of Bethesda, but inasmuch as our topic to-day is pathological we must leave this side of the question to be dealt with at another time and place.

THE RESULTS OF COUCHING.

The testimony of many reliable witnesses has established the fact that the results obtained by the concher deserve to be described as appalling. This will be best illustrated by a few figures from the statistics of the 550 cases to which reference has already been made. In only 10·59 per cent. of these was the vision 1/3 and upward. The figures given refer in each case to the vision corrected with lenses. If every case with a vision of 1/10 and upward be ranked as a success, the concher can claim 21·64 per cent. Again, if anything from 1/10 vision down to a finger count close to the face be counted as a partial success, the figure for this class is 16·69 per cent. This is very much more liberal treatment than would be accorded to any Western surgeon. A very significant point of interest in this connexion is that the majority of the histories are comparatively short. Against these figures we may place the statistics of the Madras Hospital so long ago as 1903, before the present system of rigid antisepsis had been introduced. Recoveries numbered 96 per cent., poor results 2 per cent., and failures 2 per cent. These figures would indicate that the concher was losing 60 per cent. more eyes than we were. If the vast number of eyes submitted to re-clination be taken into account, this 60 per cent. of avoidable loss totals up to a staggering figure. Nor must we forget that even amongst the successes the average vision obtained is greatly in favour of the Western surgeon.

The causes of failure after couching have been worked out from a clinical point of view. The figure for iritis and irido-cyclitis comes to 35·76 per cent. of the total number of cases; glaucoma accounts for 11·05 per cent.; imperfect dislocation of the lens for 8·94 per cent.; whilst minor heads make up for the rest of the failures. There can be no doubt that in a certain number of cases the couchers, owing to mistakes in diagnosis, operate in cases other than cataract: these include glaucoma, optic atrophy, retinitis, and other conditions; but it is only fair to say that, relatively speaking, such errors are very far from common.

The material before us consists of 54 globes, the great majority of which were removed in the Madras Ophthalmic Hospital in the period from 1911 to 1915, though some are of much older date. They were placed in 5 per cent. formalin immediately on removal, and were subsequently frozen and bisected. In a number of instances one half of the eye was submitted to microscopic examination after suitable sectioning. Each of the half globes and a number of microscopic specimens have been photographed and magic lantern slides made therefrom. It will be convenient to classify our observations under a number of separate headings.

THE VARIOUS DIRECTIONS IN WHICH DISLOCATION OF THE LENS IS FOUND TO HAVE TAKEN PLACE.

Before considering this subject in the light of the pathological specimens before us, it is necessary to make certain preliminary statements.

1. Inasmuch as all our material is derived from blinded eyes, it is obvious that we are dealing with the concher's failures alone, and are excluding his successes. In a very large percentage of the latter the lens is seen, during life, to be floating freely in the vitreous, apparently untrammelled by adhesions.

2. The position in which we find the lens on bisection of the eyeball is not necessarily that into which it was thrust at the time of operation, for the changes which occur in the eye as a result of inflammatory action may profoundly alter the position into which the lens was originally forced by the concher. Nor must we forget that in those globes in which the cataract is not tightly tethered by adhesions gravity plays a part.

Having thus cleared the ground, we may start with the statement that, though the lens may be displaced in any direction within the sclero-corneal coat, backward dislocations

are by far the most common, whilst forward ones were only found 4 times in the whole series of 54 globes. None the less, each of these cases possesses considerable interest.

#### *Forward Dislocations.*

(i.) In No. 8 the couching instrument passed through the limbus, and the track of the wound can be plainly followed in microscopic sections. The ciliary body was pushed bodily away from the sclera, and the lens nucleus was forcibly thrust into the space formed by this cyclo-dialysis (Fig. 3); it is to be seen embedded in a dense mass of inflammatory exudate, whilst its capsule, with some of the cortex, lies in the normal situation.

(ii.) In No. 44 the capsule and the nucleus of a Morgagnian cataract are seen floating in the vitreous chamber. During life the nucleus frequently passed backwards and forwards between the aqueous and vitreous cavities. The same phenomenon, though rare, has been observed in other couched eyes.

(iii.) No. 61 is probably an instance of the same kind of thing having happened at an earlier period. (Fig. 4.) Now, however, the small dark Morgagnian nucleus is seen fixed in the lower part of the anterior chamber, into which it doubtless gravitated by its own weight, and there set up inflammatory mischief, which led to its adhesion to the surrounding parts, and to its becoming fixed *in situ* by the formation of organising exudate.

(iv.) In No. 108 the only evidence of lens material present was the capsule of a Morgagnian cataract, which lay impacted in the lower part of the anterior chamber. (Fig. 5.) On section, Morgagnian fluid escaped, and no trace of a nucleus could be detected. It is of interest to record that the writer has, on a number of occasions, operated on Morgagnian cataracts, in which the lens nucleus had been reduced to the thickness of a lamellar disc, or in which no trace of a nucleus could be detected. In this case no adhesions had formed, and during the transit of the specimen to England the capsule fell from its position to the bottom of the bottle.

#### *Backward Dislocations.*

Dislocations backward are the rule, and very wide variations are found both in the completeness and in the direction of the displacement.

Those in which the lenses, or their nuclei, have been completely dislocated into the vitreous, and there lie floating more or less freely (Fig. 6) are 9 in number. In 7 of them the cataracts were Morgagnian, and in the 2 others there was a bulky nucleus with a thin covering of stiff cortex. In 7 the tension of the globe was high; in 6 the retina was completely or nearly completely detached, and in 2 of them it was so much folded as to limit the movements of the lens.

From a consideration of the lenses found floating in the vitreous, we turn to that of those which were entangled in a more or less consistent inflammatory exudate occupying the vitreous chamber. (Fig. 7.) During life such lenses were reported to be fixed or nearly so. In the specimens they are seen to be nested in a mass of exudate, which holds them imprisoned against the ciliary body and the back of the iris. Usually this exudate is limited in quantity, and is confined to the anterior portion of the eye, and principally to the neighbourhood of the dislocated lens. More rarely it is very abundant, and occupies a large part or even the whole of the vitreous chamber. (Fig. 8.) We shall deal with this exudate more fully at a later stage; for the present it suffices to state that it is inflammatory in origin, and that it contains a large number of cells. Of the 6 cases which form this group, 3 were Morgagnian cataracts; 5 were certainly dislocated in their capsule, the sixth is hidden in such dense exudate that it cannot be clearly seen. It is desirable to make it clear that intermediate forms are found between this group and the previous one. In other words, there is no hard-and-fast line between the cases in which the lenses float freely in the vitreous and those in which they are, to a greater or less degree, tethered by the pathological thickening of the hyaloid body.

We have next to consider a group of 10 eyeballs, in each of which the dislocated cataract was firmly fixed to the ciliary body and to the back of the iris by definitely organised fibrous tissue. (Fig. 9.) These globes present certain well-marked features of some interest. 1. The percentage of Morgagnian cataract is much lower than that in the preceding groups, and corresponds closely with the normal frequency of this form of cataract in Indian practice. 2. The cataract was dislocated *in its capsule* in no less than 8 of the 10 cases. 3. The retina was totally detached in 2 and very extensively so in 1; in every one of the remaining

this membrane showed the presence of white dots, apparently on its surface. 4. The time which had elapsed since operation in the cases falling under this group is remarkable. In one it is given as 7 months; in 2 others there is no history; in the remaining 7 the duration was from 2 to 20 years, with an average of well over 7 years. The association of the presence of white dots with these long histories is remarkable and will be taken up in a later section.

No. 99 (Fig. 10) is a specimen of special interest for two reasons—viz. (1) the cataract is fixed to the globe unusually far back, being attached to the retina a little behind the equator of the eye; (2) the dislocation has taken place in an upward direction, and therefore against the action of gravity. From time to time we meet clinically with a couched lens whose suspensory ligament, though torn through over a wide circumference, has been spared at one part, which acts as a hinge. The loosened lens flaps backwards and forwards with the movements of the eye, at times obstructing the pupil and at others being lost to sight. If the hinge is above the cataract usually blocks the pupil when the head is erect; but one meets with cases in which the lens floats up out of the way unless the face is thrown forward into the horizontal plane; this is apparently due to a check-ligament action of the remaining suspensory fibres of the lens. Should inflammation be set up in such an eye and the lens become involved in the exudate it will become fixed, as in this case, in the upper segment of the globe.

When we come to speak of the changes found in the vitreous we shall have occasion to refer to the frequency with which the hyaloid body is represented by a shrunken cone with its apex at the optic nerve and its base in the neighbourhood of the ora serrata. This form, which is well known to pathologists, is due to the anatomical attachments of the vitreous body, and to the fact that the latter undergoes shrinkage after being thickened and opacified by the presence of inflammatory exudate. In studying the present collection one cannot fail to be struck with the fact that the exudate, which fixes, or helps to fix, the lens in its pathologic position, is one with, and part of, this cone-shaped new formation. Before leaving the consideration of this group we must once again point out that no hard-and-fast line separates it from the preceding one, and that intermediate links between the two can easily be pointed to.

In 11 globes, *dislocated cataracts were found matted between the iris and ciliary body in front and the completely detached retina behind*. It is very difficult to say what the nature of the original cataracts was, since all that one can now find is a nucleus, usually rather dark-coloured, embedded in a mass of inflammatory tissue. (Fig. 11.) These nuclei are undergoing steady reduction in bulk as the result of phagocytic action. In 7 of the 11, the lens remnants lie either within the complete capsule, or in its near neighbourhood. The interior of the capsule is usually found to have been invaded by the mass of inflammatory and organising tissue which mats together all the structures (i.e., the iris, the ciliary body, the remains of the lens and the detached retina), and which occludes the angle of the anterior chamber. The completeness of the dislocation varies greatly. In some cases the lens is hardly moved from its usual position, and lies in front of the anterior hyaloid membrane, whilst in others it is displaced into the vitreous cavity. In one instance the detachment of the retina and the inflammatory changes are sharply limited to the lateral half of the eye towards which the cataract was dislocated, but this case belongs more to the next group than to the one we are now discussing.

There are three outstanding and very important features common to these cases: (1) in the great majority of them there is evidence that the operation was followed by severe irido-cyclitis; (2) 9 of the 11 were shrinking eyes with low tension; and (3) the time which had intervened between the couching and the enucleation was between one and two years in every case save one, in which it is probable that the furnished statement of three months was inaccurate. It will be noticed that the histories are much shorter than those in the previous group. This, together with the other two points mentioned, indicates that we have to deal with a condition widely different from that in any of the previous groups. Here the inflammatory process had been induced by a septic infection of the eyes of a decidedly more virulent character, though it fell short of that acme of infectivity,

which leads in so many cases of the Indian operation to pan-opthalmatitis and destruction of the globe within a few weeks.

We come next to a group of 5 cases, which have one feature in common—viz., that the cataract, though dislocated backwards, lies distinctly in front of the anterior hyaloid membrane, and therefore outside the vitreous cavity. (Fig. 12.) In 3 of them the solid parts of the lenses have been pushed back from their original position in such a way that they act like wedges, forcibly keeping the anterior hyaloid membrane in a plane posterior to that which it would normally occupy. Out of these 5 cataracts 4 were cortico-nuclear; the fifth was too much altered for it to be possible to state what its nature was. In certainly 4 out of the 5 moderately severe iridocyclitis had followed the couching, but the exudative process was a much less severe one than that which characterised the specimens of the previous group. The consequence was that there was no such matting of all the parts concerned as is there seen. In every case the detachment of the retina was complete or nearly so, but in not one was the lens enwrapped in its folds. This we may attribute to two causes:—

(1) a merely contributory

one, that the vitreous cavity was not invaded, and (2) that the infection was less virulent and the inflammation consequently less severe than in the members of the previous group.

There is a small group of 3 cases in which the remains of the lens lie *in situ* in the periphery of the capsule, whilst the central portion has disappeared. These resemble the peripheral after-cataracts not infrequently seen following the extraction of a not fully matured lens.

In conclusion, we have to mention two specimens in which the condition found was so unusual that it would scarcely have been possible to have anticipated its occurrence.

The first of these was one of the earliest globes sectioned. A Morgagnian lens, entire in its capsule, was found *thrust behind the retina*. It lay against the scleral coat close to the ciliary body; it had detached the retina over a large area in the neighbourhood of the ora serrata, and had led to a complete separation of it on that (the nasal) half of the eye. The edge of the detached retina had contracted adhesions to the front of the lens capsule and was much puckered in that neighbourhood, doubtless as the result of cicatrisation.

The second specimen (Fig. 13) shows many features in common with the last. The lens is entire in its capsule and is almost certainly Morgagnian; the tear in the retina through which it was thrust now cicatrised up, leaving a puckered scar. The retina is totally detached, and on section the cataract lay as far forward as the separation of that membrane would permit. The pupil was blocked by exudate, and atrophic scars in the iris showed that there had been extensive laceration of that membrane. The globe was removed a year after operation.

The sequence of events in these two cases was probably as follows. The posterior operation must have been adopted and the incision placed far back; a wide tear in the retina resulted; the lens, completely separated from its attachments, was kept entire by the toughness of the Morgagnian capsule, whilst the fluidity of its contents made its insinuation through the retinal tear an easy matter. The fact that a case has recently been recorded in which, in a boy of 17,

the lens spontaneously escaped through a 2 mm. trephine hole, throws a sidelight on such cases as these.

#### ACCIDENTAL INJURIES TO OTHER STRUCTURES THAN THE LENS DURING COUCHING.

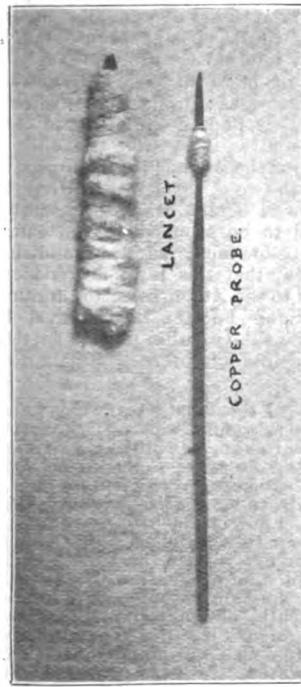
Though the primary object of the Indian cataract coucher is to depress the lens, he may accidentally injure any or all of the other structures of the eye. Evidence of such damage is obtained both clinically and pathologically.

##### *The Cornea.*

Opaque scars on the cornea are quite frequently seen in the out-patient room in eyes which have been subjected to the anterior operation, but are rendered invisible in formalin-mounted specimens owing to the opacification of the membrane. Other evidence of corneal injury is, however, available.

In No. 9 a corneal fistula is present, lying to the inner side of the centre of the eye. (Fig. 14.) The lamellæ immediately surrounding it are largely replaced by connective tissue; the whole thickness of the membrane is markedly reduced, and the lining epithelium is irregular and vacuolated. The iris is very closely adherent to the back of the cornea near the fistula, but more loosely attached further out. There has evidently been some ulceration of the cornea and the formation of a limited staphyoma, which burst at a later date, leaving the fistula now seen. It is probable that the point of fistulisation was determined by the use of a septic instrument at the time of operation, and that septic keratitis followed, leading to early perforation with entanglement of the iris. On the other hand, it is possible that the *enclavement* of the iris occurred as the instrument was withdrawn. In either case, the later sequence of events included the formation of a staphyoma, a secondary rise in tension, and a fresh perforation at the weakest point, resulting in the production of a permanent fistula.

FIG. 2.



Instruments used in couching.



The operation of couching.

In No. 45 the lens capsule is adherent to the back of the cornea, the iris being widely torn and being probably also involved in the synechia. (Fig. 15.) All that remains of the lens is a brown nucleus; the cataract was evidently Morgagnian. It is probable that after the escape of the fluid it contained the lax capsule prolapsed into the wound, either with the gush of fluid which accompanied the withdrawal of the instrument or at a later date.

In No. 116 it is the retina which is impacted in the corneal wound. (Fig. 16.) It seems likely that in this instance the sequence of events was as follows. A severe plastic inflammation resulted from the couching, and involved among other structures a capsular synechia, which had formed at the time of operation or soon after. The vitreous became heavily infected, and the consequent exudate became adherent, on the one hand, to the retina, which thereby underwent total detachment, and on the other to the capsule and its synechia. The progressive contraction of the scar

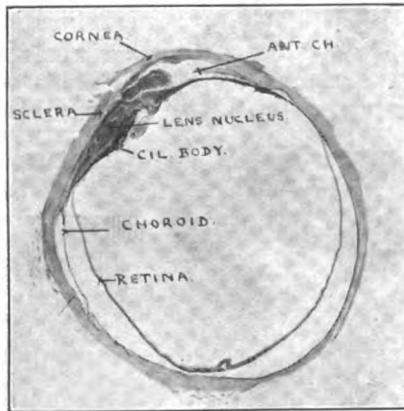
tissue then drew the retina into the wound. This would appear to be the most likely explanation, but it is not impossible, in dealing with such an operation as couching, that the retinal detachment was very extensive, and that the injury inflicted provided a path along which a direct prolapse of the retina may have occurred.

#### The Sclera.

A very large number of Indian cataract-coachers perform the posterior operation, and therefore make their preliminary incision in the sclera outside the limbus. Dr. Ekambaram, who has watched these men at work, believes that they deliberately endeavour to avoid the ciliary body, and it also looks as if some of them purposely place their incision below the external rectus muscle. Like his Western *confrère*, the Indian surgeon does not always succeed in placing his incision just where he wishes to; this is not surprising, as many of them work without any local anaesthetic, and not a few of their patients are nervous and unruly to the last degree. Moreover, it is more than probable that there are different opinions amongst couchers as to the best site for the preliminary cut. These considerations will serve to explain the variety of location of the scars, as found in the specimens before us; indeed, some such explanation is called for, since the cicatrices may be found as far forward as the limbus and as far back as the equator of the globe; what is more, they may be seen in the present collection, not only in their common situation, on or near the horizontal meridian, but in any of the quadrants of the eye.

As a rule, the evidence of injury to the sclera is to be inferred from the interference with the parts beneath that coat, and such instances will be taken up when we come to consider the lesions of the ciliary body and choroid; but occasionally we have been fortunate enough to hit off the scleral scar either in the original division of the globe or during the course of sectioning of part of it for the purpose of microscopic examination.

FIG. 3.



Lens dislocated between c. b. and sclera. (8.)

In No. 306 the track of the original wound can be seen as a pigmented scar in the sclera immediately behind the line of the ciliary processes. Microscopic sections show: (1) that the pigmentation of the deeper part of the scar is due to the impaction of uveal tissue in its depth; (2) that there is a fistulous scar running right through the thickness of the sclera; and (3) that the subconjunctival tissue in the neighbourhood of the wound is permeated by large open spaces lined with endothelium. (Fig. 17.) It is clear that a limited measure of filtration had been established, but this apparently proved insufficient to keep the tension of the eye from rising, as is shown by the deep glaucomatous cupping and by the obliteration of the anterior chamber.

No. 43 shows a scar a little farther back, in the neighbourhood of the ora serrata; but in this case the wound appears to have healed solidly. The pigment of the underlying uveal tissue shows a marked disturbance, whilst before the specimen was cut it was observed that the sclera was pigmented in the neighbourhood of the cicatrix.

In No. 8 the wound lay in the limbus, and the solidifying scar can be traced right through the thickness of the ocular tunic and down to the mass of inflammatory exudate which surrounds the dislocated lens, and fills the angle of the

anterior chamber. Here, again, the uveal pigment can be traced some distance up into the scar, in which it is distinctly entangled.

#### The Uveal Tract.

In quite a large number of couched eyes one can see, during life, evidence of past injury to the iris in the form of more or less extensive scars, many of which probably also involve the ciliary body. Moreover, in other cases, one can infer the presence of injury to the ciliary body and the choroid from the existence of pigmented cicatrices in the sclera. Anatomically, the present series of eyeballs affords additional information on this head. Iris scars are fairly common. In one case, already referred to, the coucher has effected a cyclo-dialysis; in three more the wounds lie across the front parts of the ciliary processes; in six they involved the region of the orbiculus ciliaris, and in one of these the scar lies as much on the choroid as it does on the ciliary body (*vide* Fig. 7); lastly, in four the wounds lie well behind the ciliary body, being placed in two of them just in front of the equator and in two more well behind it. Taking them as a whole, the wounds tend to be grouped in the outer quadrant of the eye, above or below the horizontal meridian. It has already been pointed out that this is in accordance with Ekambaram's evidence as to the site of selection for the incision in the posterior operation. Far the best method of examining these scars is by transillumination with a bright light from behind. Some points of interest remain for consideration.

In No. 44 the wound lay behind the ciliary processes; the instrument, or more probably its point, tore off a tongue-shaped process from the posterior surface of the iris, thus thinning that membrane over this area; the torn portion contracted an adhesion to the subjacent hyaloid membrane, which was itself infiltrated with inflammatory exudate; the appearance presented is curious and interesting.

In several of the globes scar-tissue radiates from the wound area into the surrounding tissues, and is then a strong contributory factor in the production of retinal detachment. In one globe (No. 130) two scars are to be seen, one of which was evidently placed too far back by mistake (Fig. 18); the eye also furnishes contributory evidence that things did not go well during the operation, for the iris is very widely lacerated. It seems probable that the patient was refractory or the surgeon unskilful. In any case it is clear that the instrument was introduced a second time.

In No. 148 a caseating mass in the eyeball (Fig. 19), lying behind the equator, was found to contain a fragment of metal; the latter was most unfortunately lost at the time the section was cut, but it was presumably the tip of the couching instrument, and its presence, taken with the facts that the wound was placed very far back and that dislocation of the lens was not effected by the operation, would seem to indicate that the patient moved violently and that the operator failed in his purpose. The strong, but strictly localised, inflammation excited suggests that the metallic fragment was of copper, and this is in accordance with the known facts of the case, since the probes used by these men to displace the lens are made of that metal.

No. 72 is also a specimen of special interest. Here, too, the puncture lay behind the equator, and there seems to have been some difficulty in penetrating the choroidal and retinal coats which were carried in front of the instrument, the result being a wide separation of these two tunics from their scleral bed. (Fig. 20.)

No. 297, removed six weeks after the operation, is an eyeball which had undergone pan-opthalmatitis and had burst through a point in the sclera on the horizontal meridian somewhere in front of the equator. It is probable that a septic wound of entrance determined the site of the bursting. The lecturer has seen suppurating globes in which the sclera at one point had completely sloughed, the intense inflammation present bearing witness to the violence of the infective process.

#### Uveitis.

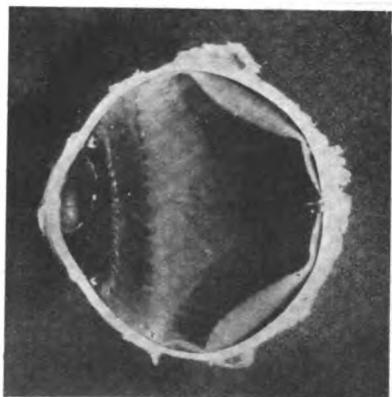
The type of inflammation of the uvea found in these specimens was plastic and was mostly confined to the iris and ciliary body. The intensity of the inflammation varied very greatly. In a number of specimens the evidence of inflammatory action was either absent or only to be detected on very careful examination. On the other hand, a large number of cases present themselves at Indian hospitals in which suppurative pan-opthalmatitis has followed the operation of couching. In Madras such globes were eviscerated, as it was considered dangerous to enucleate them, and much interesting material has thus been lost. All the intermediate stages between the very slight and the very severe

FIG. 4.



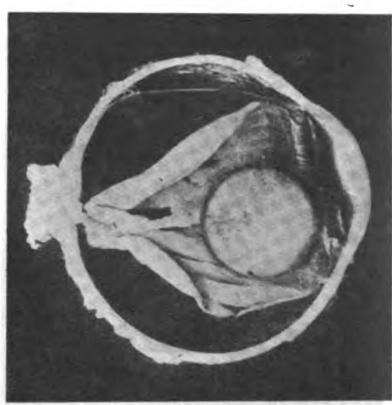
Left eye, temporal half. (61.)

FIG. 5.



Right eye, nasal half. (108.)

FIG. 6.



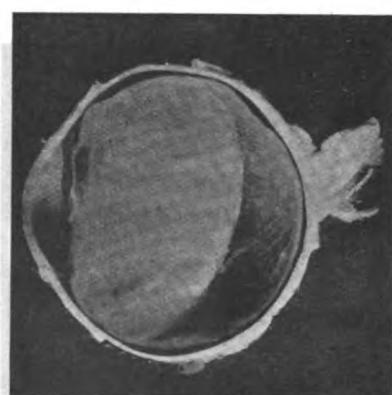
(50.)

FIG. 7.



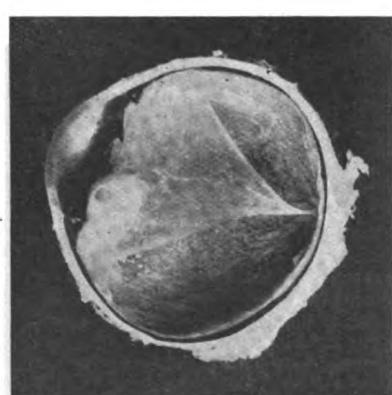
Left eye, upper half. (136.)

FIG. 8.



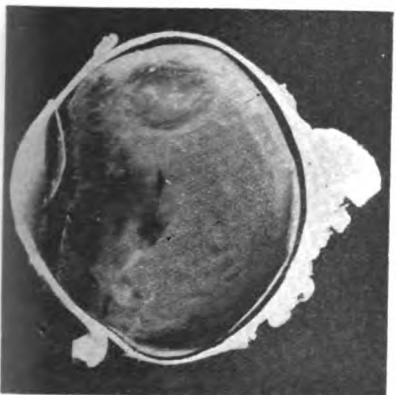
Left eye, lower half. (197.)

FIG. 9.



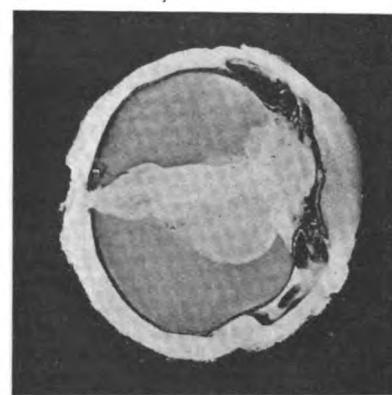
Left eye, lower half.

FIG. 10.



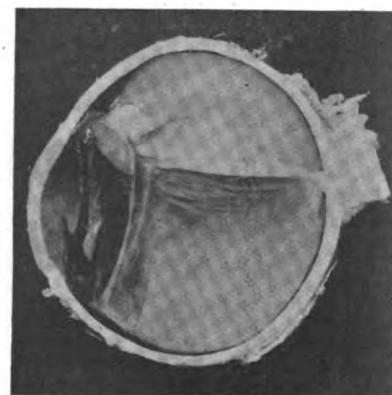
Left eye, upper half. (99.)

FIG. 11.



Left eye, upper half. (171.)

FIG. 12.

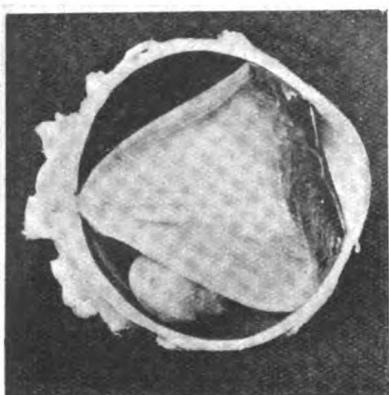


Right eye, upper half. (119.)

Inflammations can be traced in the specimens before us. This is in accordance with what we should have expected in what was practically a series of inoculations of healthy globes with pathological materials, which varied enormously in their nature and in the quantity introduced. Nor must we forget the great differences in the ages and in the conditions of health of the patients. The plastic mass poured out from the ciliary body and iris had in many cases enveloped the remains of the lenses (Fig. 21), which can be seen in process of disintegration under the action of

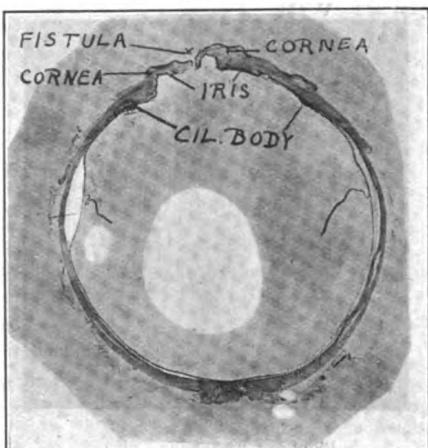
phagocytosis or of fluid absorption. Evidence of calcification of the lens was obtained in at least one specimen, and the same process was also found at work in the uveal coat of several others. The rupture of the lens capsule has provided a ready path of ingress for the inflammatory exudate, which can be seen filling the cavity of the capsule as well as surrounding it; the curly remains, both of the anterior and of the posterior portions of the capsule, can be clearly traced in many of the specimens embedded in dense masses of organising inflammatory exudate. In several such the

FIG. 13.



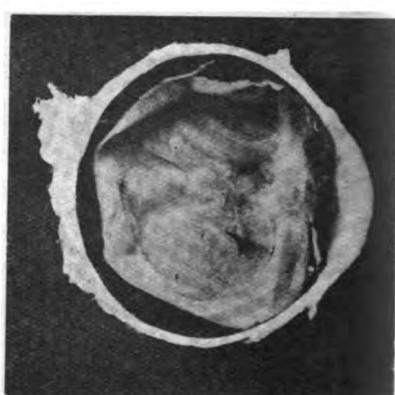
Right eye, lower half. (138.)

FIG. 14.



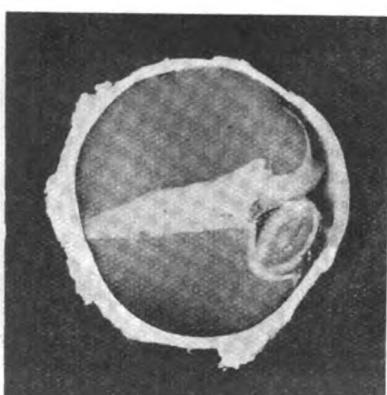
Left eye, lower half. (9.)

FIG. 15.



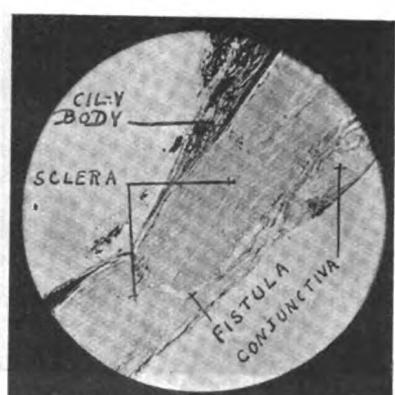
Right eye, lower half. (45.)

FIG. 16.



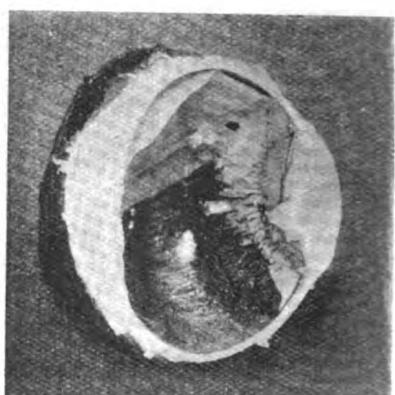
Right eye, nasal half. (116.)

FIG. 17.



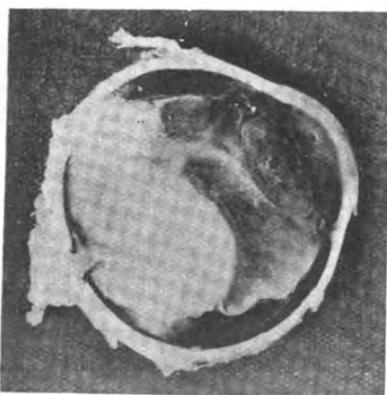
Fistulous scar in sclera. (306.)

FIG. 18.



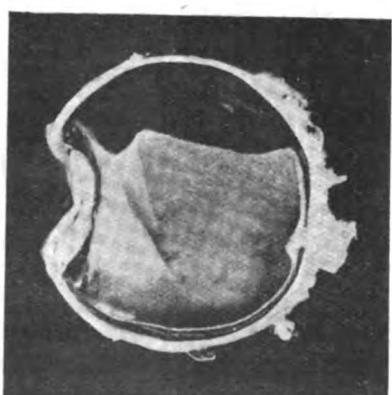
Left eye, upper half. (130.)

FIG. 19.



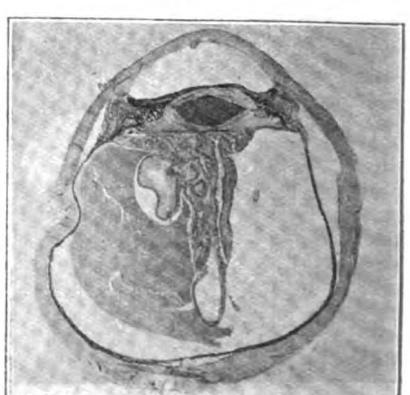
Upper half, left eye. (148.)

FIG. 20.



Right eye, lower half. (72.)

FIG. 21.



Left eye, upper half. (171.)

absence of the capsule opposite, or to one side of the pupillary area, and the curled-up ends of the elastic membrane, mark the spot where rupture was effected at the time of operation.

In only one instance has any evidence of proliferative uveitis come to light, and in this one the nodule in the iris consists of mononuclear lymphocytes; epithelioid and giant cells are conspicuous by their absence. The interest of this observation centres in the fact that a large number of these globes were removed with the object of guarding against the

occurrence of sympathetic ophthalmia or of making safer the performance of an extraction in the opposite eye. So far as the first indication is concerned it would appear that the danger of sympathetic mischief in the second eye after couching is not great. The deduction thus drawn from pathological data is confirmed by the lecturer's clinical experience, for, as far as his observations go, it is extremely rare to see the second eye lost by sympathetic ophthalmia after this operation.

(To be concluded.)

## THE TREATMENT OF SEPTIC WOUNDS WITH BISMUTH-IODOFORM- PARAFFIN PASTE.

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AND  
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*With an Account of the BACTERIOLOGICAL AND CHEMICAL ACTION OF BISMUTH-IODOFORM-PARAFFIN PASTE, by HELEN CHAMBERS and J. N. GOLDSMITH, M.Sc., Ph.D.*

(Reports to the Medical Research Committee.)

OPINIONS still differ as to the best means of combating bacterial infection of wounds. At the present time two methods commonly used in military hospitals are those of Dr. Carrel and Sir Almroth Wright, and in both of these continuous treatment is required if satisfactory results are to be obtained.

The ideal method is to maintain continuous inhibition of bacterial growth in the wound with the least possible disturbance of the tissues and the patient. In June of last year Professor Rutherford Morison informed us of the excellent results which he was obtaining at the Northumberland War Hospital from the use of a paste composed of bismuth sub-nitrate, iodoform, and liquid paraffin. He kindly gave us the details of his treatment.

The bismuth-iodoform paste has been used extensively in our wards, and we have records of over 400 cases so treated; the results of 62 of these cases are given in Table I. These results are incomparably better than those of the previous year, when we were using eusol, hypertonic saline, with continuous irrigation or frequent dressings.

The composition of the paste is as follows: iodoform 2 ounces, bismuth subnitrate 1 ounce, and liquid paraffin q.s. Any consistency may be made, but the most useful are those of soft butter and thick cream. We have followed the method of treatment recommended by Professor Rutherford Morison in THE LANCET of August 12th, 1916. The patient is put under an anaesthetic, all gangrenous and necrosed tissue is cut away, and the wound thoroughly cleansed; it is swabbed out with rectified spirit, and then a small portion of the paste is vigorously rubbed into the tissues, a little being left in the bottom of the wound, which in many cases is closed with interrupted stitches, and dressed with gauze wrung out in spirit. No further dressing is required for 7 to 14 days. The work in a surgical ward is much reduced when patients do not require daily dressings, and it is a great advantage to the cases if painful and disturbing manipulation can be avoided.

Observation shows that (a) the paste maintains a continuous antiseptic action in the wound; (b) it acts as a lymphagogue, and a free exudation of serum washes the wound from within outwards; (c) it does not prevent the escape of discharge; (d) granulation tissue grows freely in contact with it; (e) drainage-tubes and gauze drains are unnecessary; (f) septic wounds heal nearly as rapidly as non-infected ones; (g) bone union is rapid and the tendency to form sequestra is slight.

Both the constituents of the paste are toxic if absorbed freely. Only one case of such absorption has occurred; it is discussed later. Acting on the recent advice of Professor Morison, the quantity of paste now used rarely exceeds 2 drachms; with this amount the risk of toxic absorption is negligible.

The details of a large number of severe wounds treated with bismuth-iodoform-paraffin paste have been collected and summarised. In order to obtain a true conception of the results the cases have not been selected for their rate of progress; they include all the cases treated by this method wounded during July, August, and September, 1916.

To decide the progress of the cases the data given are: (1) The duration of the febrile period; (2) the length of time before healing; (3) for cases complicated with bone injury,

the persistence of sinuses, and the formation of sequestra. For a comparison of results the first two are open to objection, since many septic wounds are afebrile and the time taken to heal varies enormously, depending largely on the extent of surface injury and the rapidity with which a plastic operation can be done. The third is the most valuable, and the cases complicated with fractured bones have therefore been grouped together. Table I. is a detailed list of 62 cases of compound fractures which had left hospital before Nov. 30th, 1916. Similar tables have been made for the 35 cases of compound fracture still under treatment after this date, and for the wounds not complicated with bone injury.

### Summary of Results.

The total number of compound fractures quoted is 97, the average febrile period was 10 days, and 51·75 per cent. of them were completely healed within 2½ months of being wounded. An analysis of the 62 completed cases in Table I. shows that 50 have healed, only 4 have sinuses, and 8 have superficial wounds.

The 35 incompletely treated cases have an average febrile period of 15·65 days and the average time since wounding was 87·85 days; 14 of these have superficial wounds only. All the cases not complicated with bone injury had healed by Nov. 30th, with the exception of 4. The average febrile period of 40 of the severest of these cases was 3·35 days, and the time in hospital 42 days.

It is an advantage to cases of compound fracture that the wound can be left undisturbed for periods of 7 to 21 days and that drainage-tubes are not required. This is important, as macerated specimens of fractured bones from cases treated with continuous irrigation have shown apertures through the bone directly due to the drainage-tubes and not to the original injury. The best results are obtained when B.I.P.P. treatment is applied soon after the man has been wounded. If partial necrosis of bone has occurred before the case has been admitted the formation of a sequestrum is unavoidable, but it is found that after it has separated one operation is usually enough to effect complete healing.

Six cases complicated with suppurating joints have required amputation after being treated with the paste, and these might be looked upon as failures. In all these cases extensive infection had occurred before they came under this treatment. Post-operative examination of the amputated limb showed that sepsis had subsided in the area to which the paste had been applied, but that the infection had spread extensively, and the paste had not reached the whole of the infected area. For example, in a case of severe gunshot wound of the hand, pus had tracked among the carpal bones and along the tendon sheaths of the forearm.

In a total of 400 only one case of secondary haemorrhage occurred. This patient had a deep wound of the buttock, which was nearly healed. He had been up and moving about for three weeks when an aneurysm of the gluteal artery ruptured, necessitating the ligation of the internal iliac artery.

No case of gas gangrene or tetanus has developed in our wards since B.I.P.P. treatment was begun, although many of the wounds have grown anaerobes and some of them the tetanus bacillus. The data available here are not sufficient to decide whether this result is in any way due to the B.I.P.P., or whether it is entirely due to the antitetanus serum which every patient receives.

One case of iodoform poisoning occurred when the treatment was first begun and when larger quantities of paste were used; it was characterised by fever, emaciation, and delirium. The symptoms subsided when the treatment was discontinued. Several cases of "blue gum" have been observed, but we are not satisfied that these are attributable to bismuth absorption.

In conclusion, the principles which underlie this method of treatment and that of Carrel and Dakin may be compared. In the latter a very powerful antiseptic agent of high solubility is employed, but the effect is so transitory that it is necessary to renew it at short intervals. Professor Morison employs a less powerful antiseptic and one which is of feeble solubility, but which is able to keep up a continuous action in the depths of the wound without requiring to be renewed for days or even weeks.

The improvement in our results with this treatment encourages us to believe that it is along this line that progress will be made in future.

TABLE I.—SIXTY-TWO CASES OF GUNSHOT WOUND COMPLICATED WITH

No.	Index No.	Nature of injury and condition on admission.	Treatment.	Day of disease admitted.	Day of disease B.I.P.P. treatment began.	No. of days febrile since admission.	No. of days after injury when healed or transferred.	Remarks.
1	44	G.S.W. head, large cerebral hernia 2 in. diam., projecting 1 in. Trephined before admission.	No operation. 52 days after admission B.I.P.P. applied to hernia. Before this it had slightly increased.	14	66	0	117	21 days after B.I.P.P. was applied hernia had disappeared.
2	175	Penetrating g.s.w. neck. Fractured cervical vertebra, oesophagus and L. brachial plexus injured. Admitted with suppurating sinus of neck.	28 days after admission operation sinus curetted. 75 days after admission 2nd operation. Loose piece of bone from front of 4th cervical vertebra removed. B.I.P.P. inserted into cavity in front of spine. Wound stitched.	44	119	25	140	Healed.
3	72	G.S.W. R. chest, C.F.R. scapula, 6th and 7th ribs. C.C.F.R. ulna.	8 days after admission operation, F.B. removed from arm. Wounds cleaned, B.I.P.P. inserted.	5	13	5	43	All wounds healed. Later discharged light duty.
4	108	G.S.W. shoulder, C.F.R. scapula, V.S.W.	31 days after admission B.I.P.P. inserted.	3	34	37	79	Auxiliary hospital.
5	178	G.S.W. L. shoulder, C.C.F.R. scapula, L.S.W., F.B.	3 days after admission operation, cleaning, many loose pieces of bone removed, B.I.P.P. inserted.	3	6	2	46	Healed.
6	60	C.F.R. scapula.	2 days after admission B.I.P.P. inserted.	6	8	0	24	Healed. Later discharged full duty.
7	150	C.C.F.R. clavicle and scapula. L.W. open, subclavian vessels exposed.	2 days after admission operation, B.I.P.P. inserted.	6	8	2	92	A.H. Wound not healed. Sequestrum.
8	41	C.F.R. humerus, near elbow, involving joint. Very severe.	1 day after admission operation, wound cleaned, B.I.P.P. inserted.	3	4	1	32	Healed.
9	78	C.F.R. humerus, radius and ulna. Bones of elbow-joint completely blown away.	1 day after admission operation, wound cleaned, sloughs removed, B.I.P.P. inserted.	6	7	17	82	"
10	75	G.S.W. L. shoulder, penetrating wound, S.B.I. surgical neck of humerus.	3 days after admission operation, cleaning, loose pieces of bone removed, B.I.P.P. inserted.	5	8	6	35	Healed. Discharged to duty.
11	142	C.C.F.R. humerus and spine of scapula. Head of humerus removed before admission, V.S.W.	1 day after admission operation, tubes removed, B.I.P.P. inserted.	14	15	21	65	Transferred; almost healed, no sinus. Superficial wound only.
12	147	G.S.W. elbow-joint, C.C.F.R. all bones, V.S.W.	16 days after admission operation, abscess opened, 2 loose pieces of bone removed, B.I.P.P. inserted.	4	20	28	98	Healed.
13	148	C.C.F.R. humerus, lower end. Dislocation of elbow-joint, V.S.W.	5 days after admission B.I.P.P. inserted. 13 days after admission operation, lower end of humerus removed.	23	28	16	123	"
14	3	C.F.R. humerus, lower end.	1 day after admission operation, cleaning, 2 pieces of shrapnel removed, B.I.P.P. inserted.	3	4	18	49	Healed. Later discharged light duty.
15	46	C.F.R. humerus near elbow-joint, V.S.W.	10 days after admission operation, incisions, wound cleaned, B.I.P.P. inserted.	5	15	23	45	Healed. Later discharged full duty.
16	84	C.C.F.R. humerus mid-shaft.	1 day after admission operation, incisions, loose bone removed, B.I.P.P. inserted.	5	6	2	46	Healed. Later discharged light duty.
17	90	C.C.F.R. humerus, surgical neck, T. and T., V.S.W.	On day of admission operation, B.I.P.P. inserted.	12	12	7	66	" " "
18	7	C.F.R. humerus near elbow-joint, V.S.W.	1 day after admission operation, cleaning, B.I.P.P. inserted.	3	4	1	43	" " "
19	97	C.C.F.R. humerus.	3 days after admission operation, cleaning, B.I.P.P. inserted.	6	9	1	49	Healed. Later transferred A.H.
20	106	C.C.F.R. R. humerus mid-shaft. Right hand amputated by shell. C.F.R. L. ulna.	3 days after admission operation, B.I.P.P. inserted.	15	18	5	59	A.H. 97 days all wounds healed. Discharged from Army.
21	177	C.C.F.R. humerus, F.B.	3 days after admission operation, cleaning, many loose pieces of bone removed, B.I.P.P. inserted.	5	8	3	63	Healed. Discharged duty.
22	147	C.C.F.R. elbow. Operation, head of radius removed before admission. V.S.W.	16 days after admission operation, loose bone removed, abscess of joint opened, B.I.P.P. inserted.	4	20	28	98	Healed.
23	16	G.S.W. R. forearm, C.C.F.R. radius, V.S.W. Much loss of tissue.	1 day after admission operation, B.I.P.P. inserted.	8	9	8	65	"
24	18	C.F.R. humerus, clean wounds. C.F.R. radius, V.S.W.	On day of admission B.I.P.P. applied.	8	8	0	55	A.H. Superficial wound, no sinus. Later discharged light duty.
25	51	C.C.F.R. ulna mid-shaft, T. and T.	4 days after admission operation, wounds cleaned. 4 days later B.I.P.P. inserted.	2	10	0	44	Healed. Later discharged duty.
26	92	C.F.R. radius and ulna near elbow.	4 days after admission B.I.P.P. inserted.	14	18	1	66	Healed. Discharged light duty.
27	117	C.F.R. ulna, mid-shaft, V.S.W.	On day of admission operation, B.I.P.P. inserted.	6	6	0	60	A.H. Sinus persistent.
28	142	C.C.F.R. radius, mid-shaft.	7 days after admission operation, B.I.P.P. inserted.	2	9	0	41	Healed. Transferred.
29	169	C.C.F.R. ulna, shrapnel removed, tube inserted before admission.	12 days febrile, then 7 days rising temperature. 19 days after admission operation, B.I.P.P. inserted.	6	25	9	81	A.H. 81 days. Superficial wound, no sinus. Later discharged full duty. Wounds of forearm healed. Temperature due to empyema.
30	55	C.C.F.R. ulna and radius, T. and T., V.S.W., complicated with empyema.	3 days after admission B.I.P.P. inserted.	37	40	22	56	Healed. Later discharged from Army.
31	8	G.S.W. L. hand, C.F.R. metacarpals, V.S.W.	5 days after admission loose bone removed, B.I.P.P. inserted.	3	8	0	33	" " "
32	74	G.S.W. L. hand, C.F.R. metacarpals, two fingers blown off, V.S.W.	4 days after admission B.I.P.P. inserted.	5	9	9	68	" " "
33	109	G.S.W. L. hand, C.C.F.R. 5th metacarpal.	5 days after admission operation, B.I.P.P. inserted.	9	14	3	30	A.H. Later discharged full duty.
34	76	C.F.R. ilium, L.S.W., F.B. near sacro-iliac joint.	8 days after admission operation, B.I.P.P. inserted.	6	14	7	45	A.H. 63 days after wound discharged full duty.
35	31	G.S.W. buttock, S.B.I. sacrum, F.B.	13 days after admission operation, wounds cleaned, B.I.P.P. inserted.	4	17	19	92	Healed. Later discharged from Army.
36	139	C.F.R. femur, S.B.I., shaft intact.	4 days after admission operation, cleaning, B.I.P.P. inserted.	8	12	7	50	A.H. No sinus.
37	33	C.C.F.R. femur.	3 days after admission operation, cleaning, B.I.P.P. inserted.	6	9	7	38	Healed. Later discharged light duty.

## FRACTURED BONES, WHICH HAD LEFT HOSPITAL BEFORE NOV. 30TH, 1916.

No.	Index No.	Nature of injury and condition on admission.	Treatment.	Day of disease admitted.	Day of disease B.I.P.P. treatment began.	No. of days febrile since admission.	No. of days after injury when healed or transferred.	Remarks.
38	34	c.fr. femur, v.s.w.	4 days after admission operation, B.I.P.P. inserted.	5	9	3	84	Healed. Later discharged light duty.
39	54	c.fr. femur, upper third.	12 days after admission B.I.P.P. inserted.	7	19	24	70	Healed.
40	137	c.c.fr. R. femur, near great trochanter, v.s.w.	On day of admission operation, loose bone removed, B.I.P.P. inserted. Later two further operations.	8	8	14	147	A.H. Not healed.
41	17	c.fr. tibia and fibula, t. and t.	On day of admission B.I.P.P. inserted.	35	35	0	64	Healed. Transferred A.H.
42	29	c.fr. tibia and fibula, v.s.w.	1 day after admission operation, cleaning, B.I.P.P. inserted.	11	12	8	69	Transferred A.H. Persistent sinus.
43	35	c.c.fr. tibia and fibula.	1 day after admission B.I.P.P. inserted.	7	8	0	76	Healed. Transferred A.H.
44	67	c.c.fr. tibia, v.s.w.	3 days after admission operation, cleaning, B.I.P.P. inserted.	5	8	4	38	Superficial wound, no sinus. Later discharged full duty.
45	97	c.fr. tibia, t. and t.	1 day after admission operation, abscess opened, B.I.P.P. inserted.	27	28	1	97	A.H. Persistent sinus.
46	99	c.c.fr. R. fibula, t. and t., v.s.w.	14 days after admission B.I.P.P. inserted.	12	26	0	69	A.H. Superficial wound. Later discharged full duty.
47	119	c.c.fr. tibia, lower third, external malleolus.	3 days after admission operation, B.I.P.P. inserted.	4	7	1	98	A.H. Superficial wound. No sinus. Later discharged from Army.
48	116	g.s.w. leg penetrating tibia, v.s.w.	7 days after admission operation, loose bone removed, B.I.P.P. inserted, wound stitched.	3	10	7	50	A.H. Superficial wound, no sinus.
49	155	g.s.w. L. leg, s.b.i. tibia, s.w.	3 days after admission B.I.P.P. inserted.	10	13	1	23	Healed. Discharged duty.
50	19	g.s.w. L. ankle, os calcis disorganized.	6 days after admission operation, cleaning, B.I.P.P. inserted.	3	9	3	61	Healed. Transferred.
51	20	g.s.w. R. foot, l.s.w., t. and t.	1 day after admission operation, cleaning, B.I.P.P. inserted.	9	10	0	35	A.H. Surface wound, no sinus.
52	28	c.c.fr. 2nd and 3rd metatarsals, t. and t.	7 days after admission operation, cleaning, loose bone removed, B.I.P.P. inserted.	5	12	1	33	Healed. Later discharged light duty.
53	38	g.s.w. L. foot, t. and t., v.s.w.	1 day after admission operation, cleaning, B.I.P.P. inserted.	3	4	6	77	A.H. No sinus, superficial wound.
54	42	g.s.w. R. foot, t. and t., v.s.w.	1 day after admission operation, cleaning, B.I.P.P. inserted.	3	4	3	40	Healed. Discharged light duty.
55	71	c.fr. 5th metatarsal, R. foot, v.s.w.	5 days after admission B.I.P.P. inserted.	7	12	0	40	Healed. Later discharged full duty.
56	85	g.s.w. foot, c.fr. cuboid. t. and t.	5 days after admission B.I.P.P. inserted.	4	9	0	50	" " "
57	80	g.s.w. R. foot, s.b.i. head of 5th metatarsal, v.s.w.	2 days after admission operation, cleaning, B.I.P.P. inserted.	4	6	0	31	Healed.
58	91	g.s.w. foot, c.fr. 1st, 2nd, and 3rd metatarsals.	3 days after admission operation, cleaning, B.I.P.P. inserted.	3	6	6	30	Auxiliary hospital.
59	105	g.w.s. L. foot, c.fr. 4th metatarsal, v.s.w., t. and t.	1 day after admission B.I.P.P. inserted.	8	9	3	76	Healed. Later discharged full duty.
60	121	g.s.w. foot, s.b.i. head of 1st metatarsal, v.s.w.	2 days after admission operation, B.I.P.P. inserted.	2	4	0	44	Healed. Later transferred.
61	176	g.s.w. L. foot, t. and t., v.s.w.	1 day after admission B.I.P.P. inserted.	5	6	2	53	Auxiliary hospital.
62	27	g.s.w. foot, c.fr. 1st phalanx great toe, t. and t., v.s.w.	5 days after admission operation, cleaning, loose pieces of bone removed, B.I.P.P. inserted.	5	10	0	36	Healed. Transferred.

Average febrile period = 6·88 days. Average time since wounding = 61·27 days.

Number completely healed = 50.

g.s.w., Gunshot wound. c.fr., Compound fracture. c.c.fr., Compound comminuted fracture. s.w., Septic wound. v.s.w., Very septic wound. l.w., Large wound. l.s.w., Large septic wound. t. and t., Through-and-through wound. F.B., Foreign body. s.b.i., Slight bone injury. A.H., Auxiliary hospital.

## THE BACTERIOLOGICAL AND CHEMICAL ACTION OF BISMUTH-IODOFORM-PARAFFIN PASTE.

BY HELEN CHAMBERS AND J. N. GOLDSMITH, M.Sc., PH.D.

The clinical results obtained by the use of bismuth-iodoform-paraffin paste recorded in the previous paper have been so striking that an explanation of its action is desirable, particularly as Professor Rutherford Morison, in his paper in THE LANCET of August 12th, 1916, p. 269, states that the explanation of its action is unknown. A series of bacteriological and chemical tests were therefore carried out as far as possible in parallel.

The bacteriological tests have been made in tubes of nutrient broth containing 20 per cent. horse serum, the test organism being a 24-hour culture of *Staphylococcus pyogenes aureus*. The practical details are noted in Table II.

A preliminary test showed that B.I.P.P. completely sterilised after 24 hours' incubation, whereas pastes of bismuth subnitrate or of iodoform with small quantities of paraffin have no appreciable action.

Bismuth subnitrate in water produces a marked acid reaction due to liberation of free nitric acid. In saline or in nutrient broth containing 20 per cent. serum there is a double decomposition with sodium chloride, bismuth subchloride and sodium nitrate being formed; no marked alteration in reaction occurs. The addition of 10 per cent. bismuth subnitrate to the test medium causes partial sterilisation which in time becomes complete; very little effect is obtained with smaller quantities. The admixture of paraffin to the bismuth subnitrate masks its action even when the bismuth salt is present in quantities of 10 per cent.

Medium : 7 c.c. nutrient broth (reaction + 5); 2 c.c. horse serum; 1 c.c. emulsion of *Staphylococcus pyogenes aureus* in saline. Circa 1 × 10<sup>9</sup> organisms. Drug added and tubes incubated for 24 hours at 37° C. 1 c.c. diluted 1/1000, plated on agar.

No.	Drug.	No. of colonies.
1.	Iodoform, 2 gm.	250
2.	" 1 gm.	∞
3.	Bismuth subnitrate, 1 gm.	200
4.	" 0·1 gm.	∞
5.	Iodoform, 1 gm. + paraffin, 0·2 c.c.	8
6.	" 1 gm. + " 0·5 c.c.	∞
7.	" 1 gm. + " 3·0 c.c.	—
8.	Bismuth subnitrate, 1 gm. + paraffin, 3·0 c.c.	8
9.	Iodoform, 1 gm. + bismuth subnitrate, 0·5 gm.	—
10.	" 1 gm. + " 0·5 gm. + paraffin, 1 c.c. (i.e., B.I.P.P.)	—
11.	Iodoform, 1 gm. + bismuth subnitrate, 0·1 gm.	4
12.	" 1 gm. + " 0·01 gm.	50
13.	" 1 gm. + " 0·001 gm.	20
14.	" 1 gm. + " 0·006 gm.	8
15.	" 1 gm. + 2 c.c. of N/10 HNO <sub>3</sub> + 5 c.c. broth + 2 c.c. horse serum	4
16.	2 c.c. of N/10 HNO <sub>3</sub> + 5 c.c. broth + 2 c.c. horse serum	700
17.	Iodoform, 1 gm. + bismuth subnitrate 0·5 gm., CO <sub>2</sub> atmosphere after twice washing with medium to remove free iodine. 1, 2, and 3 days' incubation. After 3 days air admitted and 10 c.c. fresh medium added. 24 hours incubation	∞
18.	B.I.P.P. removed from a wound after 2 weeks	10

— = sterile. ∞ = very numerous colonies.

Chemical experiments on similar lines showed that 1 gm. of bismuth subnitrate, incubated at 37° C. with 10 c.c. of normal saline for 24 hours, produced an acid reaction, N/750, with no bismuth in solution; prolonged incubation

(5 days) removed all the chloride, and produced an acid reaction with bismuth in solution. The bactericidal action of the bismuth subnitrate can therefore be attributed to surface precipitation of the protein and metallic poisoning, the acid reaction developed in saline in 24 hours being insufficient to produce the result.

Iodoform is practically insoluble in water or saline, but is slightly soluble in paraffin, 2.15 gm. dissolving in 100 c.c. at 37° C. When in solution, and in the presence of oxygen, it is readily decomposed by light or heat, liberating free iodine, the equation, according to Schoorl and Van den Berg,<sup>1</sup> being:



The decomposition started by light continues in the dark. Iodoform dissolved in liquid paraffin is not nearly so rapidly decomposed by light as its chloroform, benzene, and carbon bisulphide solutions, and light does not therefore play an important part in the present experiments, particularly as the reaction in the dark is very slow at ordinary temperatures. At 37° C., and in darkness, access of air is the ruling factor.

Two samples of iodoform from the hospital dispensary exhibited great differences in their rate of decomposition. One sample contained in 1 gm. free iodine equivalent to 0.3 c.c. N/100 iodine and decomposed more rapidly than the other, which originally contained no free iodine. The iodine formed by the decomposition of solid iodoform appears to be in solid solution in the iodoform and is only partly available for disinfectant purposes.

As is well known, iodoform in large amounts has a slight bactericidal action, probably due to liberation of iodine; in smaller quantities it has no appreciable effect *in vitro*. When iodoform is suspended in paraffin the disinfectant action depends on the free access of air and, incidentally, on the amount of paraffin added. When used in a thick paste mixed with small quantities of paraffin the drug remains at the bottom of the tubes and the antiseptic action is slight. With larger quantities the paraffin solution of iodoform floats, liberation of iodine occurs, and the medium is sterilised.

In view of the liberation of iodine from B.I.P.P. it became important to find the concentration of iodine in liquid paraffin which would sterilise. 3 c.c. of iodine solution in paraffin of N/100 concentration (1 c.c. = 0.00127 gm.) sterilised 10 c.c. of culture = 1:2600 containing 15 per cent. serum. Dakin, Cohen, Daufresne, and Kenyon,<sup>2</sup> who employed 50 per cent. serum and therefore more protein in solution, found that iodine sterilised in 1:1000 but not in 1:2500. The volume of air at 37° theoretically sufficient for the liberation of 0.00381 gm. iodine by oxidation of iodoform is 1.03 c.c.

With the object of ascertaining whether the action of the B.I.P. paste is dependent on the base or on the acid of bismuth subnitrate, experiments have been made replacing 1 gm. of bismuth subnitrate with the equivalent weight of one of the following: Bismuth oxide, bismuth subchloride, bismuth carbonate, bismuth subiodide, and sodium nitrate. None of these drugs had any bactericidal action, either alone or mixed with iodoform, with or without paraffin. These bismuth compounds do not yield oxidising agents when treated with normal saline, nor does sodium nitrate readily act as an oxidising agent. Bismuth subiodide which is contained in traces in old specimens of B.I.P.P. stored in glass bottles is also inactive. It follows that the action of the paste is not due to bismuth nor to the presence of a nitrate as distinct from free nitric acid yielded by bismuth subnitrate.

A study of the chemical changes which occur when B.I.P.P. is incubated with normal saline (the details of some of these experiments are given in Table III.) shows that the most important changes are the following:

1. The oxidation of iodoform, the liberated iodine dissolving in liquid paraffin. The supply of oxygen is the ruling factor. If protein or other iodine absorbents are present the iodine diffuses out readily from the paraffin layer; the yield of free iodine is less in the absence of these substances. 2 gm. B.I.P.P. yielded 2.4 c.c. N/100 iodine in 48 hours' incubation at 37° with broth and serum.

TABLE III.  
In the following experiments (Nos. 1-8) 2 gm. of B.I.P.P. were heated to 37° C. under the conditions stated.

No.	Air available.	c.c. saline.	Time in hours.	Iodine in saline.	Free iodine in residue.	NaCl original grammes.	NaCl final grammes.	Reaction.	Bismuth in solution.
1	12	6	71	—	1.3	—	—	—	—
2	0	12	20	—	0.0	0.093	0.073	Neutral	0
3	20	10	24	0.15	0.05	0.078	0.028	—	0
4	20	10	48	0.3	0.1	—	—	—	—
4	20	10R	48	0.4	0.1	—	—	—	—
5	20	10	68	1.0	0.2	—	—	—	—
6	20	25	68	1.0	—	—	—	—	—
7*	40	10	20	0.3	0.1	—	—	—	—
8*	40	10	17	0.66	0.1	—	—	Neutral	0
9†	40	10	144	0	4.9	—	—	—	—
10†	40	10	144	0	3.75	—	—	—	—

I As c.c. N/100 iodine.

R = reneutralised.

\* In No. 7 the B.I.P.P. used had been previously heated at 37° C. for 24 hours in an open tube; in No. 8 the B.I.P.P. had been previously heated at 100° for 6 minutes. Free iodine was estimated before and after incubation, but the table shows only the iodine liberated during incubation.

† In No. 9 the B.I.P.P. was replaced by 1 gm. BINO<sub>3</sub> + 2 gm. CHI<sub>3</sub> + 3 c.c. paraffin, in No. 10 by 2 gm. CHI<sub>3</sub> + 3 c.c. paraffin; in both experiments the saline was replaced by distilled water and the temperature was 47° C.

2. An exchange of acid radicles between the sodium chloride and the bismuth subnitrate, so that the latter may be converted as to 60 or 70 per cent. into bismuth subchloride. This change occurs both *in vitro* and also in B.I.P.P. in a wound, as shown by the following analysis:

	% Bi <sub>2</sub> O <sub>3</sub>	% HNO <sub>3</sub>	% Cl.
Original BINO <sub>3</sub>	80.91	7.7	—
BINO <sub>3</sub> recovered from B.I.P.P. in a wound 3 weeks	72.1	2.69	8.4

3. The formation of traces of iodine in the saline solution. The following negative results are also of interest:

1. The absence of bismuth salts in the solution except in exceedingly minute quantities; on one or two occasions this amounted to 0.0002 gm., as BINO<sub>3</sub> in 10 c.c., but in the majority of experiments with normal saline it could not be detected.

2. The absence of more than traces of bismuth subiodide in the B.I.P.P. after incubation.

If B.I.P.P. is heated on a water bath until it is distinctly coloured by free iodine the subsequent rate of decomposition at 37° is considerably increased.

It seems clear, therefore, that the bactericidal action of B.I.P.P. results from the free iodine liberated from the oxidation of iodoform by oxygen and by the nitric acid formed by the hydrolysis of bismuth subnitrate. One gramme of this drug incubated at 37° C. for 24 hours with 10 c.c. of water produced N/50 nitric acid (0.1 per cent. HNO<sub>3</sub>). In experiments made with iodoform and N/50 or N/100 nitric acid added as oxidising agents, in the absence of bismuth subnitrate, sterilisation was obtained, and the corresponding chemical tests suggested that when the oxidation has begun nitrous acid (of which a trace was detected) can act catalytically with atmospheric oxygen as it does on potassium iodide.

On this hypothesis it should be possible to reduce very largely the quantity of bismuth subnitrate and still obtain bactericidal action, provided oxygen is available, but in the absence of oxygen the reaction should cease, even with the usual maximum amount of bismuth subnitrate. Both these conclusions were confirmed by *in vitro* experiments. The chemical analyses gave the following results:

Oxidation of iodoform in presence of bismuth subnitrate and saline.—2 gm. of iodoform, 10 c.c. of normal saline, and varying quantities of bismuth subnitrate were heated for 5 days at 37°.

—	Bismuth sub-nitrate.	Acid reaction.	Free iodine in residue.	Total iodine in solution.
1	0.1	N/10,000	2.3 c.c. N/100	0.2 N/100
2	0.5	N/2,000	2.2 " "	0.2 "
3	1.0	N/30	6.1 " "	0.1 "

In the third experiment the sodium chloride originally present was 0.078 gm. which was found to be partly converted

<sup>1</sup> Chem. Centralblatt, 1905 (2), 1718. (Extensive literature—e.g., Hardy and Willcock, Proc. Royal Soc., 1903, lxxii, 200; Plotnikow, Zeit. f. physikal. Chemie, 1911.)

<sup>2</sup> Proc. Royal Soc., 1916, lxxxix, 251.

into sodium nitrate, the final quantity of sodium chloride in solution being only 0.049 gm.

In the bacteriological tests the bismuth subnitrate has been reduced from 1 gm. to 0.001 gm., with no marked diminution in the antiseptic action. Further, when oxygen is eliminated by replacing the air with an atmosphere of CO<sub>2</sub> (any free iodine originally present in the mixture having been removed by washing with fresh medium), the paste has no appreciable antiseptic action. Air subsequently admitted enables it to disinfect as usual.

The mechanical effect of fluids percolating through a film of B.I.P.P. tends to remove the paraffin—there is then a possibility of bismuth disinfection; some of the bismuth subnitrate, which is lighter than iodoform, is also removed. The chief reaction is the continued liberation of small quantities of iodine from a mixture practically insoluble in saline, governed by the oxygen supplied from the air or from arterial blood.

Numerous cultures taken from open wounds under B.I.P.P. treatment have shown, without exception, that the wounds are not bacteriologically sterile, but there is a reduction in the number of bacteria. No change in the flora has been detected. A large number of the wounds are infected with anaerobic organisms, and *B. perfringens*, *B. malignantæma*, *B. Hibler IX.*, and *B. tetani* have been recovered from some of these cases. Although the organisms are present in the wounds they are not able to proliferate freely, and the wounds heal as if surgically clean.

Most of the cases under this treatment excrete to a varying extent products of the decomposition of iodoform, and the general effects of iodide absorption may have some bearing on the results.

## CLINICO-ANATOMICAL INVESTIGATION OF A RAPIDLY FATAL CASE OF GENERAL PARALYSIS DUE TO ACQUIRED SYPHILIS.

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THE following case has several striking and unusual features which we think should be recorded. It is that of a young married woman, 26 years of age, who came under care at Bexley Asylum on June 19th, 1916, suffering from general paralysis. Her previous history is as follows:—

She was the tenth child of a family of 11, seven of whom survive her, all said to be healthy and strong. The father died at the age of 59, following an accident sustained two years previously. The mother is alive and well and was the source of our information. The patient was a tall girl for her age, well developed, and had no indications of any congenital disease. She had commenced work as a daily girl at 15 years of age, and was afterwards engaged at a mineral-water manufactory until her marriage at the age of 19. She was "considered a bright, intelligent girl," was "always fond of her home," "never gave her parents any trouble," and was "never given to racing out at night." She kept company with the young man she ultimately married from the age of 17, was married at 19, and gave birth to her first child a week later. The infant was "a fine, big, healthy child," and was suckled by the mother until it was ten months old. The boy is now living, and is a well-developed intelligent boy just seven years of age. His blood was examined by Dr. Mott and was found to give a negative Wassermann.

Two years after her marriage the patient gave birth to a four months' foetus. She had a very bad time and took several weeks to recover. Fifteen months later she gave birth to a dead child which was thought to be seven and a half months. During this pregnancy she complained bitterly about pains in her head; she had bad sore-throats very frequently, and her voice became much altered in tone. She became pregnant a fourth time, and expected her confinement at the end of March, 1916. Her mother stated that the patient was out shopping on Saturday evening (March 4th)

with her little son. She called at her house, and when she sat down commenced trying to speak, but her words all ran into each other and her voice became very tremulous, so that what she said was unintelligible. She took her home and the patient partially recovered her speech in about half an hour, though it still remained very tremulous and indistinct. She was not seen by a doctor. She became markedly worse the following Thursday; she had three fits, and was taken to the infirmary. Information obtained from the infirmary was to the effect that she was in a semi-conscious condition; vomiting continuously; incontinent; did not speak unless addressed, and then only with difficulty; and did not sleep well. She was confined of a female child, weighing 5½ lb. and measuring 19½ inches, four days after her admission. No albumin was found in the urine. On March 17th she became melancholic; was still incontinent, but was taking food. She remained in more or less the same condition until June, when she became noisy and inclined to wander. There was nothing remarkable in connexion with the labour, and the child died of infantile atrophy.

For this information we are obliged to the medical officer of the infirmary, and he also stated that there was no good evidence of congenital syphilis.

She was certified insane on June 16th, the medical certificate being as follows:—

That she is restless; does not seem to know people; says she loves me; appears to have hallucinations of sight and hearing; talks to imaginary people; does not appear to have any memory; is dirty in habits. Nurse states that she is noisy and troublesome; that she talks to imaginary people; says her baby is in the next bed to hers, and swears at it; says another patient has stolen her baby; is spiteful to those who come near her; does nothing for herself.

She was admitted to Bexley on June 19th, her physical and mental state then being as follows:—

General bodily condition and nourishment fair. No stigmata of congenital disease. Complexion fresh. Palate: wide arch. Teeth well formed and regular. An abundance of brown, fine hair. Nervous system: motor impairment considerable, partly in consequence of incoordination. Coarse general tremors. Speech tremulous. Coordination of arms impaired; of legs very bad. Station and gait impossible. Tactile sensation could not be tested. Knee-jerks absent. Ankle clonus spurious. Deep reflexes of arms brisk. Brisk flexor plantar reflex. Other superficial reflexes indefinite owing to muscular contractions. Deglutition normal. Sight good. Movement of eyes complete. Pupils: size medium, equal, regular. Mobility to light: right nil; left very slight; to accommodation (r. and l.) fair; consensual (r. and l.) nil. Exophthalmos: nil. Other systems: nothing remarkable.

Mental state on admission. She was confused, quite unable to realise the nature of her surroundings, and could not give any reliable information about herself. All the mental faculties were grossly impaired. Though she chattered a great deal of nonsense about herself, there was no evidence of definite hallucinations or delusions. Most of the time she was unduly elated, hilarious, and self-satisfied, but she readily became lacrymose. She was restless, garrulous, picked at her bedding, and had a trick of stuffing the corner of the sheet into her mouth. She showed a good deal of purposeless resistiveness and muscular rigidity. Was defective in habits and required spoon-feeding.

Her condition was diagnosed as one of general paralysis of the insane; but as we had no definite history with her it became a question, in view of her age and the vague statement accompanying her that she had a family, as to whether she was a case of congenital or acquired syphilis. Her blood and cerebro-spinal fluid were examined at the Pathological Laboratory of the L.C.C. Asylums, Maudsley Hospital, and found to give a very strongly positive Wassermann reaction. On June 26th her condition was noted as follows:—

She is suffering from general paralysis of the insane. She is very demented, happy, contented, and emotional. Her memory is grossly impaired, and she is unable to converse on the simplest topic. In happy, slow, slurred, and hesitating speech, she said: "I love gentlemen." She is fairly nourished.

The disease made very unusually rapid progress, and she died from exhaustion of general paralysis on Sept. 25th. Only a partial autopsy was possible, but we managed to

obtain the brain. Macroscopic examination did not reveal any of the naked-eye appearances of brain syphilis or of G.P.I. The granulation of the floor of the fourth ventricle is the most characteristic and constant naked-eye sign, and it was absent in this case; moreover, the membranes were not thickened. Nevertheless, an emulsion of a small portion of the frontal lobe examined by Dr. Mott microscopically by dark-ground illumination and by Fontana staining method demonstrated the presence of numbers of spirochaetes.

We had several interviews with the husband, who stated that he remembered his wife complaining of her hair coming out and of being troubled with sore-throats and headaches, more especially during the period which followed her third pregnancy. We obtained a sample of his blood for examination, as well as that of the boy, the results of which have been mentioned. The husband denied having suffered from any form of disease, and certainly bore no obvious traces. He was emphatic in his protestations against ever having suffered from a sore either of the genitals or elsewhere. Dr. Mott found that his blood gave a positive (+40) Wassermann reaction.

The points which occur to us as being worthy of especial notice are:—

1. The extreme rapidity which characterised the progress of the disease, six months and a few days only elapsing between the earliest observed symptoms and death.

2. The naked-eye signs of the disease were not apparent, and, but for the presence of the Wassermann reaction of the cerebro-spinal fluid (during life and post mortem) and the finding of the spirochaetes in the brain, it would have been difficult to have come to a decision as to the cause of the mental symptoms manifested during life.

3. The case is of interest in showing the value of the examination of the cerebro-spinal fluid as a means of diagnosis in even the earliest stages of the disease; it is also of interest in the fact that the spirochaetes were found in an emulsion of the apparently normal brain by the dark-ground illumination method, after five minutes' search. This conforms with the experience of Levaditi, who showed that spirochaetes could be found at the seat of inoculation before the chancre appeared. There was no time for the connective-tissue formation to occur in a sufficient degree to cause naked-eye changes of the brain, but histological investigation of sections of the frontal and central cortex, however, showed the characteristic chronic perivascular inflammation; and by the special silver method spirochaetes were found in sections of the inflamed areas. It may be inferred, therefore, that the multiplication of the syphilitic organisms in the brain was the cause of the deviation of the complement by the cerebro-spinal fluid, and that the abundant toxins produced by the rapid growth of the organism were responsible for the perivascular inflammation and neurone degeneration.

4. These histological microscopic changes may be correlated with the characteristic clinical symptoms presented by the case for the comparatively short time prior to the fatal issue. It has been the experience of Dr. Mott to find that the spirochaetes are more easily found in these rapidly fatal acute cases, in which macroscopic changes are not evident, or not markedly so. A likely spot for finding the spirochaetes may be disclosed by feeling gently the cortex, and if the resistance is less marked an emulsion of that region is advisable, but emulsions of cortex from several soft spots should be made. It may be mentioned here that in 100 successive cases of general paralysis spirochaetes were found in 66. In advanced cases where there has been arrest of active symptoms, and death has occurred from some intercurrent disease in the demential stage, the syphilitic organisms are less easily found.

5. Contrary to the original statement of Noguchi, the spirochaetes are found in the inflammatory cell infiltration of lymphocytes and plasma cells of the perivascular sheaths, rather than in the cortical brain substance; and this has been my experience in other cases. This being the case, we can understand why the cerebro-spinal fluid gives a positive reaction in the earliest stages of the disease, for the perivascular sheaths form a part of the irrigation system of the cerebro-spinal fluid, which functions in all probability as the lymph of the brain. It is the toxins produced by the spirochaetes, and not the organisms themselves, which produce the chronic inflammatory process, for only at certain places can the spirochaetes or their

degenerated forms be seen. Consequently the spirochaetes at a focus of development, by virtue of the soluble toxins produced, may have a far-reaching irritative effect on the perivascular lymphatic sheaths, leading to widespread congestive stasis and neurone decay. Prior to the decay the toxins contained in the perineuronal spaces may irritate and lead to increased functional activity of the neurones, and the excitement evinced in the early stages of this disease may be thus accounted for by intoxication effects acting more or less on the whole brain, but, as in the case of generalised epileptiform seizures, on the motor cortex especially.

Although there was no naked-eye cortical atrophy, indicative of neuronic decay and destruction and neuroglia-cell proliferation, yet the histological examination showed that both these morbid processes were present over a wide area of the fronto-central cortex.

## THE PREVALENCE OF *SPIROCHAETA EURYGYRATA* IN EUROPEANS AND NATIVES IN THE GOLD COAST.

By J. W. SCOTT MACFIE, D.Sc., M.B. EDIN., PATHOLOGIST, GOLD COAST.

RECENTLY, owing to the return to England of a large number of soldiers suffering from dysentery and diarrhoea, a general interest has been evoked in a number of protozoal organisms which for many years have been familiar to every worker in the tropics. Amongst others the spirochaetes found in the intestines have come in for their share of attention, and the commonest species, *Spirocheta eurygyrata*, has recently been described in detail by Fantham (1916).

In West Africa the occurrence of small spirochaetes in the faeces has long been recognised, but the consensus of opinion has been that they were not pathogenic. Under abnormal conditions, in cases of dysentery or diarrhoea, however, they were known sometimes to occur in myriads, and it was believed they might in these circumstances be a subsidiary cause of illness. In view of the revived interest in these organisms a brief note on their prevalence in Europeans and natives in the Gold Coast Colony may not be inappropriate.

### Materials Examined.

Previous experience had proved that the spirochaetes were most readily found in the faeces after purgation, and for this reason most of the specimens examined were taken from patients to whom a saline aperient had been administered for simple constipation, as a preliminary to surgical treatment, or for the purpose of ascertaining if helminth infections were present; but in addition the fluid or semi-solid motions from cases of dysentery and diarrhoea were searched as well as some normal stools. The specimens were examined both fresh and after fixation and staining. Leishman's stain and gentian violet were used; the latter when drawings were to be made for the purpose of measuring the length of the organisms, and the former when the structure of the cytoplasm was to be studied.

Flagellates, *Trichomonas*, &c., are also very commonly met with in faeces in the Gold Coast and had to be remembered, as their flagella, which they are apt to lose, sometimes simulate spirochaetes. This fallacy, although it had to be kept in mind, was not found to be a serious difficulty in practice. The (?) sprouting vegetable cells, so troublesome in many animals, are, fortunately, absent from men.

In this manner a large number of Europeans and natives and a few Syrians have been examined since February, 1916, and in every case spirochaetes have been present. I have not failed so far to discover them in a single individual examined for these organisms at Accra. In the Europeans they were generally relatively scarce, but in many of the natives and some Europeans they were abundant. Cases of amoebic dysentery were not, as a rule, exceptionally heavily infected, but in some patients suffering from diarrhoea they were so numerous that it was difficult to believe that they could have been entirely harmless.

The last 20 cases examined, which included 5 Europeans, 14 natives, and 1 Syrian, may be taken as a typical sample. In the Europeans the spirochaetes were scanty in 4 and abundant in 1, the latter individual being a healthy man.

One subject was simultaneously infected with *Entamoeba histolytica* and another with *Trichomonas intestinalis*. Both loosely and closely coiled organisms were found in 2 cases, and in the other 3 loosely coiled specimens only. In the natives the spirochaetes were abundant in 8 and scanty in 6 persons; in 4 they were countless. Three of the subjects were simultaneously infected with *E. histolytica*, 3 with *Trichomonas intestinalis*, and at least 2 with *Blastocystis enterocola*. Of the 4 most heavily infected individuals 2 showed spirochaetes only; 1 harboured *Trichomonas* and *Blastocystis*, and 1 *E. histolytica* and *Blastocystis* as well. Only loosely coiled spirochaetes were found in 10 cases, only closely coiled ones in 1, and in the remaining 3 both types were present. The single Syrian examined harboured a few loosely coiled spirochaetes; his faeces also contained ova of *Tenia saginata*.

#### Morphology.

Werner (1909) described two types of spirochaetes found in his own faeces at a time when he was apparently in good health, but as he had previously been in German South-West Africa his infection may have been contracted in that country. The one type, to which he gave the name *S. eurygyrata*, showed widely separated coils and varied in length from  $4\cdot6\ \mu$  to  $7\cdot3\ \mu$ ; the other, *S. stenogyrata*, had a closely coiled body from  $3\cdot5\ \mu$  to  $6\cdot1\ \mu$  long.

Fantham (1916), as a result of his study of the spirochaetes, found in the motions of soldiers from Gallipoli and Flanders, has concluded that the two species described by Werner are really morphological variations of the same organism, which he finds may show widely or closely set waves according to the nature of its movements, and may measure from  $3\ \mu$  to  $15\ \mu$  in length. The spirochaete has pointed ends and is about  $0\cdot25\ \mu$  broad.

The spirochaetes found on the Gold Coast conformed fairly well to the description given by Fantham. In the majority of the specimens the organisms showed only a few widely set waves, but in a few they were all closely coiled, and in others both forms were met with. Both types of the spirochaete had pointed ends, and when measured were found to be of about the same length and breadth. It was decided, therefore, that although superficially unlike each other they must really be forms of the same parasite, a conclusion which was confirmed by measuring a large number of

them the coiling of the body was more or less obscured. Progression was accompanied by rapid helicoid movements, the axis of the spirochaete being often a straight line. Either end might advance, and a reversal of direction was frequent. Catherine-wheel-like movements were seen and in stained preparations tangles were found. The body was

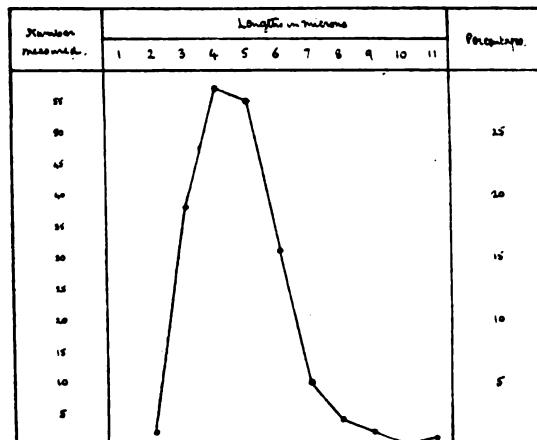


Chart showing measurements of length plotted as a curve.

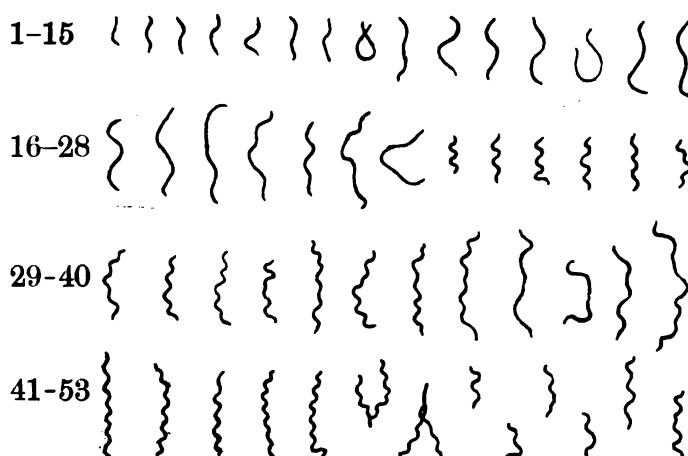
flexible and was bent into a variable number of waves or coils. Some spirochaetes were simply curved like a bow, many had two or three waves, and some had as many as six or more. The number of the waves varied with the thickness of the organism and also with the character of its movements. I cannot, however, completely confirm Fantham's statement that the number of coils is primarily an index of rate of motion, for on the one hand the most active spirochaetes were those showing lashing movements, and they were only loosely coiled, and on the other hand quiescent or dead specimens were often closely coiled. The most closely coiled organisms I ever saw were some that had died in a preparation with hydrochloric acid (0.2 per cent.) which had been incubated at  $37^\circ\text{C}$ . for six hours (Figs. 41-45). The spirochaetes in the saline solution control to this experiment were still alive and active and were decidedly more loosely coiled (Figs. 48-53). The ends of the organisms were pointed. The cytoplasm was generally homogeneous, but occasionally the body was seen to be banded by chromatin rodlets. So small and delicate were the spirochaetes that the membrane, if it existed, was in most specimens indistinguishable; in a few, however, there did appear to be some indication of its presence. Coccoid bodies were seen within a few specimens.

The spirochaetes were very slender, measuring about  $0\cdot25\ \mu$  in breadth. It was impossible to determine their diameter with accuracy, but some specimens were sensibly thicker than others.

The length of the spirochaete was determined by measuring 200 individuals taken as they came from 10 different cases (see Table I.). The shortest measured  $2\ \mu$ , the longest  $11\ \mu$ , and the average was  $4\cdot7\ \mu$ . This statement is, however, misleading, as the longer forms were rare, and the same remark applies, I believe, to that made by Fantham to the effect that *S. eurygyrata* varied in length from  $3\ \mu$  to  $15\ \mu$ . A much better idea of the length of the spirochaete is obtained by plotting the measurements as a curve, as has been done in the chart shown above. It is then seen that 75 per cent. of them measured from  $3\ \mu$  to  $5\ \mu$ , and no less than 90 per cent. were

within 4 microns of each other in length, between  $3\ \mu$  and  $6\ \mu$ . Very occasionally extremely long individuals were found, some of which exceeded  $30\ \mu$  in length. These forms I believe to have been multiple.

The spirochaete underwent both longitudinal and transverse division. Dividing forms composed of two daughter spirochaetes united by a delicate filament were relatively rarely seen, but those that were found measured from  $7\ \mu$  to  $11\ \mu$  in total length and the daughter spirochaetes from



All the figures were drawn with the aid of an Abbé-Zeiss camera lucida at a magnification of 2000 diameters. Figs. 1-40, various forms of *S. eurygyrata* found in human faeces; Figs. 1-22, loosely coiled type; Figs. 23-35, closely coiled type; Figs. 36-40, forms undergoing transverse fission. Figs. 41-47, closely coiled forms found after exposure to 0.2 per cent. hydrochloric acid; Figs. 48 and 49, showing longitudinal division. Figs. 48-53, spirochaetes from the control in normal saline solution for comparison with Figs. 41-45.

the organisms from different cases and plotting their lengths as a curve. The organism was therefore identified as *S. eurygyrata* Werner, emend. Fantham.

Since a detailed description of this spirochaete has recently been published it will be unnecessary to do more than briefly state the more important characteristics. When alive the organisms were very active, exhibiting lashing, undulatory, and corkscrew movements. The most active individuals were those executing lashing movements and in

$3\mu$  to  $5\mu$ . The number of dividing forms included in the 200 specimens measured was not sufficient to produce a secondary crest on the curve.

Spirochaetes resulting from a recent division might therefore measure from  $3\mu$  to  $5\mu$  in length, and individuals which had reached  $7\mu$  might already be undergoing transverse division, although most commonly this would not happen until they were somewhat longer. The natural size of the organism would appear to be approximately  $3\mu$  to about  $8\mu$ .

TABLE I.—*The Measurements of Length of S. eurygyrata Werner, emend. Fantham.*

Host.	Number measured.	Measurements in microns.		
		Minimum.	Maximum.	Average.
European ...	10	2	6	3·6
" ...	10	3	7	4·1
" ...	10	3	11	5·9
" ...	25	3	7	4·6
Native ...	10	3	6	4·2
" ...	10	3	6	4·5
" ...	25	3	6	4·2
" ...	25	3	7	4·4
" ...	25	2	9	5·3
" ...	50	3	9	4·9
—	200	2	11	4·69

For some time after death the spirochaetes continue to be recognisable, although they do not long survive their host. In smears of the intestinal contents made at autopsies about 24 hours after death they are all dead, but still preserve their normal coiled appearance. When stained their bodies are affected somewhat irregularly and give the impression that they are partially degenerated. On one occasion 25 individuals, taken as they came, were measured and were found to average  $5·7\mu$  in length, a figure slightly greater than that for fresh specimens.

#### Geographical Distribution.

So far as I am aware there are no data from which the geographical distribution and frequency of occurrence of *S. eurygyrata* can be determined. There are, indeed, a few references in the literature to the occurrence of spirochaetes or spilla in human faeces, and some of these have been collected by Fantham, but they are of little assistance. It does not appear to be definitely known whether or not they occur in normal or diarrhoeic motions in Europe.

Fantham states that "perhaps even as high as 50 per cent. of the cases examined" by him were infected with these organisms, but most of his patients were soldiers suffering from various forms of dysentery or diarrhoea contracted in Gallipoli or Flanders; many of them must previously have resided or served in tropical countries, and they had probably all been exposed to the chance of infection by contact with other soldiers who had served in the tropics. A few normal persons were also examined, but it is not stated that spirochaetes were found in any of them.

In view of the fact that *S. eurygyrata* appears to be invariably present in the human intestine at Accra on the Gold Coast, West Africa, it would be interesting to know if the infection is equally common in other tropical countries and if it also occurs in healthy persons in Europe.

#### Distribution of the Spirochaetes in the Host.

The fact that the spirochaetes were most easily found after purgation or in persons suffering from diarrhoea suggested that they frequented mainly the upper reaches of the bowel and were swept thence into the large intestine and rectum. A series of preparations made at an autopsy showed that the organisms were present in the stomach, in the small intestine at various points, in the caecum, and in the large intestine, but in this particular case they were not plentiful in any of these situations. In a second case they appeared to be most numerous in the caecum, but were nowhere abundant.

The action of the gastric juice might have been expected to be injurious to such a delicate organism as *S. eurygyrata*, and as evidence obtained from the examination of specimens taken after death is not indisputable some experiments were carried out in the laboratory to determine the action of 0·2 per cent. hydrochloric acid. A small portion of faeces in which spirochaetes abounded was emulsified with the acid solution and kept in an incubator at  $37^\circ\text{C}.$  and simultaneously a control with normal saline solution was made.

The acid had no immediate injurious action on the spirochaetes, but on some occasions appeared to stimulate their activity, and for an hour or two, at any rate, living specimens continued to be present and no sensible difference could be detected between them and those in the controls. It was not easy to be certain that none of the spirochaetes were killed, however, owing to the minute size of the organisms and to the fact that in every sample both immobile and active individuals were present. In one such experiment living spirochaetes were still present in the acid solution after two hours' incubation, and appeared to be just about as numerous as in the controls; but after six hours they had all died, whereas those in the controls were still most lively. By this time evaporation had considerably reduced the volumes of the fluid, a fact which may have been important. Smears were made from these preparations at this stage, and after fixation were stained. In the controls the spirochaetes, which had been extremely active, were found to be loosely or but moderately closely coiled (Figs. 48–53); but in the acid solution they were all unusually closely coiled (Figs. 41–45). Certain other changes appeared to have taken place: many of the spirochaetes were exceptionally thick and Y-forms (Figs. 46 and 47) were common, as if longitudinal division had been active before the organisms died; a number of multiple forms were found, and coccoid bodies were quite common. These changes seemed to indicate that as the solution concentrated the spirochaetes endeavoured to meet the situation by emergency measures.

#### Mode of Infection.

In the case of an organism so widely distributed as we have found *S. eurygyrata* to be there can be no difficulty in the spread of the infection, either directly or by the contamination of food. When exposed to the action of 0·2 per cent. hydrochloric acid in laboratory experiments the spirochaetes did not appear to be injuriously affected, for some hours at any rate; indeed, their activity often seemed to be increased, and at autopsies smears made of the stomach contents showed that they were present in this part of the gastrointestinal tract. Infection from man to man by means of the spirochaetes themselves is therefore a possible and probable event.

The occurrence of spirochaetes in which the cytoplasm had concentrated so as to form granules pointed to another means of dissemination, for these so-called coccoid bodies have been considered to be the cross-infective stage. Fantham (1914 and 1915) believes that *S. bronchialis* is transmitted from man to man by means of these bodies, and although he cannot be said to have proved the fact he has brought forward some evidence in support of it. The same author speaks of them as being "resistant." If, indeed, the granule phase is an integral part of the life-cycle of spirochaetes, as seems most probable, it is a reasonable hypothesis to suppose that they play a part in the dissemination of the organisms. In the lower bowel during the solidification of the faeces, and more particularly when exposed to the air after expulsion, the spirochaetes find themselves in a medium in which their normal active life cannot be continued, and perhaps in consequence proceed to the formation of coccoid bodies. Unfortunately, it is at present impossible to recognise these bodies when freed amongst the innumerable granules found in the faeces, but they are often seen before they escape from the parent spirochaete, and if they are resistant they must be an important factor in transmission, since they might convey infection from man to man through the air, on soiled linen and utensils, and by the agency of flies, &c.

#### The Occurrence of Spirochaetes Resembling *S. eurygyrata* in Various Animals.

Elsewhere I have recorded (1915) the occurrence of a spirochaete resembling *Spirochaeta eurygyrata* in the intestine of a monkey which died of amoebic dysentery in Accra. These organisms averaged a little over  $5\mu$  in length and were indistinguishable from the species found in human beings.

More recently I have examined the faeces of a few other animals—namely, sheep, cattle, goats, pigs, dogs, cats, and rats—and have found in them spirochaetes similar to, if not identical with, *S. eurygyrata*. They did not appear to be pathogenic to their hosts, and I am inclined to regard them as saprophytes. This is not the proper place to describe these organisms in detail, but I may perhaps be permitted to

make a few remarks about them in view of their bearing on the human infection.

Spirochaetes not readily distinguishable from *S. eurygyrata* were found in sheep. Some of them had loosely, others closely, coiled bodies; their ends were pointed, they were very slender, and of 25 drawn with the aid of a camera lucida the shortest measured  $3\mu$ , the longest  $7\mu$ , and the average was  $4.7\mu$ . Very similar, if not identical, organisms were found in cattle, pigs, and goats; but in these animals, when stained preparations were examined, great difficulty was experienced in distinguishing the spirochaetes from other bodies, probably of a vegetative nature.

In rats, both the wild and the albino *Epimys ratus*, intestinal spirochaetes were exceedingly common and were morphologically indistinguishable from *S. eurygyrata*. There is therefore no necessity to repeat the description, but in Table II. a few measurements of length are given in support of my statement.

TABLE II.—*The Measurements in Length of Intestinal Spirochaetes from Man and Various Animals.*

Host.	Number measured	Lengths in microns.										
		1	2	3	4	5	6	7	8	9	10	11
Man ...	200	—	2	38	57	55	31	10	4	2	—	1
Monkey ...	25	—	—	5	10	8	2	—	—	—	—	5.3
Rat ...	50	—	3	8	11	12	4	3	—	1	—	5.0
Sheep ...	25	—	—	3	7	11	3	1	—	—	—	4.7
Cattle ...	25	—	—	8	7	2	3	2	3	—	—	4.7
Goat ...	25	—	—	3	3	8	5	4	1	—	1	5.5
Pig ...	25	—	—	3	6	6	6	2	—	2	—	5.2
Dog ...	50	—	10	23	13	4	—	—	—	—	—	3.2
Cat ...	25	1	11	9	4	—	—	—	—	—	—	2.4

The spirochaetes found in the faeces of cats and dogs appeared to be similar, but they were much more abundant in the latter animals. They were of a type resembling *S. eurygyrata*, but appeared to be smaller. When alive the structure and movements of the organism did not show any characters of specific importance. The spirochaetes were generally loosely but sometimes rather closely coiled; their ends were usually pointed, but in the smallest specimens were more blunt; tangles were seen and specimens showing chromatitic rodlets and coccoid bodies; and individuals undergoing both longitudinal and transverse division were observed. The spirochaetes were slender but varied in thickness. They were usually very small. Fifty individuals from a dog taken as they came and drawn with the aid of a camera lucida averaged  $3.2\mu$  in length, the shortest being  $2\mu$  and the longest  $5\mu$ . Elsewhere in the same film longer specimens reaching  $9\mu$  were, however, found.

These spirochaetes may have been morphological variations of *S. eurygyrata*, but I am inclined to think that they were more probably a distinct but closely allied species. It will be necessary to study their morphology more thoroughly than has as yet been possible before deciding this point.

It is, of course, well known that spirochaetes are common in the alimentary canals of animals. All that the above remarks are intended to indicate is that various domestic animals, including rats, harbour in their intestines and excrete in their faeces spirochaetes that cannot be distinguished by morphological characters from *S. eurygyrata*, the organism which infects man. Whether the various spirochaetes are actually identical or not it is difficult to say; and as they are not definitely pathogenic and as infection is so common both in men and animals at Accra experiments can be of no assistance in this case. This type of spirochaete is evidently widely distributed, and if, as I believe, it is saprophytic there does not appear to be any decided reason why some of the forms found in animals should not be capable of thriving also in the human intestine, in which case they must be an important source of infection to man.

#### Pathogenicity.

As has already been stated, *S. eurygyrata*, in larger or smaller numbers, has been found at Accra in the faeces of every individual, whether European or native, examined for these organisms. As the majority of the persons examined were in a normal state of health, the pathogenicity of this spirochaete must be very slight, if indeed it is at all harmful. Hitherto in West Africa it has been regarded as unimportant but capable of multiplying in a debilitated host or in a diseased intestine to such an extent that it might become a

contributory cause of sickness. In some cases of diarrhoea for which no definite cause could be found spirochaetes have been present in countless numbers. It is hardly possible that under such circumstances they can be entirely benign.

Fantham stated that he has seen the spirochaetes penetrate epithelial scales in the faeces, become quiescent, and produce in them their "resting coccoid bodies." I have not myself seen this occur, but unless the event witnessed by Fantham was an abnormal one it is possible that the spirochaetes penetrate also the cells lining the intestine, in which case their pathogenicity would be indisputable. The organism may perhaps pass through an intracellular phase similar to that which I have recently described as occurring in a urethral spirochaete, but I was not able to discover any evidence of this. The possibility must also be considered of the spirochaete under certain circumstances invading the blood and producing a generalised infection; and in this connexion it may be recalled that *S. icterohaemorrhagiae*, the parasite discovered by Inada (1914) in Weil's disease, is described by Ito and Matsuzaki (1915) as measuring in length from a quarter the diameter of an erythrocyte to five times this length, and is in other respects morphologically a very similar organism to *S. eurygyrata*. The infection in Weil's disease has, indeed, been thought to occur through the alimentary canal (Weil, Fiedler), although the Japanese investigators appear to have favoured a cutaneous route. So far as could be ascertained, the parasites appeared to be merely saprophytic in the cases I have examined, but in the present state of our knowledge the question cannot be considered as settled.

There is one aspect of the effect of a tropical climate that has not hitherto received the consideration which is, I believe, its due, and that is the alteration produced in the intestinal flora and fauna. In their native lands Europeans are habituated to the presence of certain organisms in their intestines &c.; they live, so to speak, in symbiosis with them, and their physiological processes are suitably adapted. In a tropical country they are called upon to readapt themselves to a new set of organisms, and it is possible that much of the ailing and unfitness and many of the obscure effects of "climate" that cannot definitely be traced to meteorological conditions or recognised infections may be due to a failure to cope successfully with this demand. West Africa, for example, is by general consent admitted to have a most unhealthy "climate," and yet the meteorological conditions in many parts of it are not exceptionally bad, and many of the most devastating diseases of other tropical countries are either entirely unknown or but rarely encountered in it. There are, of course other meteorological conditions besides temperature and humidity, other pathological conditions besides those at present recognised, and various social, domestic, and organic factors that have to be considered; and amongst these unidentified influences the alteration in the intestinal flora may, I suggest, have its place. *Spirocheta eurygyrata*, which has been found to be practically always present in the human intestine at Accra, may therefore have some importance if on investigation it is found that this is an exceptional state of affairs.

#### Conclusions.

1. *Spirocheta eurygyrata* Werner, emend. Fantham, is well-nigh an invariable inhabitant of the human intestine at Accra on the Gold Coast, West Africa.

2. Similar, if not identical, organisms are found also in the intestines of various animals.

3. As a rule, the spirochaetes appear to be non-pathogenic—that is to say, their presence is not incompatible with a normal state of health, but under certain conditions they multiply so enormously that it is difficult to believe that they can be entirely benign.

Note.—Since the above was written the study of the intestinal spirochaetes of animals at Accra has been continued and an account of the results has been published in the *Annals of Tropical Medicine and Parasitology*, vol. x., pp. 331-343. It may therefore be of interest to add to what has already been stated that a monkey, a cat, rats, sheep, cattle, goats, and pigs were found to harbour organisms morphologically indistinguishable from *S. eurygyrata* the species found in man. Another advance in the knowledge of the subject is due to Mr. H. F. Carter (*Ibid.*, x., p. 391), who has recently published some remarks on the occurrence of spirochaetes in the faeces of soldiers. He examined both dysenteric and

non-dysenteric patients and found spirochaetes in 56·5 per cent. of the former, and 41·0 per cent. of the latter. These results are of interest when compared with those obtained in West Africa, but it still remains to determine the prevalence of the infection in persons who have resided in temperate regions only.

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The Laboratory, Accra.

## Clinical Notes: MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

### CASE OF ACUTE DILATATION OF THE STOMACH FOLLOWING GASTRO- JEJUNOSTOMY.

BY FRANK GODFREY, M.B., C.M. EDIN.,  
CONSULTING SURGEON, SCARBOROUGH HOSPITAL.

I RECENTLY operated on a patient, aged 23 years, who presented symptoms of pyloric obstruction, dating back for about four years. I found very marked stenosis of the pylorus, with scarring of an old prepyloric ulcer, and a moderately dilated stomach. There was also a diseased appendix bound down to the caput cæcum by old adhesions. I did a posterior gastro-jejunostomy, making the opening specially large, because of the increased size of the stomach, and removed the appendix. Beyond rather frequent vomiting, the patient showed no symptoms to cause anxiety for the first two days. She had nothing given by the mouth save small quantities of hot water and a little weak tea. On the third day the vomiting became more frequent, small quantities of watery fluid being thrown up, the pulse-rate increased, and the temperature fell to below 98° F. The patient complained of great weight in the abdomen, and she rapidly became "pinched" and collapsed. I then found a huge fluctuating tumour on the left side of the abdomen, extending down nearly to Poupart's ligament. Fearing that it was the transverse colon, which had possibly been returned twisted on itself, I opened the abdomen and found an enormously distended stomach, which I emptied. The contents were watery fluid, and represented in amount far more than the patient had had to drink. She died almost immediately.

Examination showed the gastro-jejunostomy opening to be patent, of large size, and perfect, and there was no discoverable "kink" or other obstruction in the efferent limb of the attached gut, which was empty.

I can only account for the condition as a paresis in a stomach weakened by chronic dilatation. Sir Berkeley Moynihan, to whom I related the case, told me that he had not met with a parallel one, but that he was told that exactly the same thing happens in animal experiments. One regrets that the deceptive vomiting and absence of serious symptoms prevented an earlier recognition of the condition.

Scarborough.

### CASE OF INFLAMMATION IN A PERSISTENT PATENT MECKEL'S DIVERTICULUM SIMULATING APPENDICITIS.

BY ROBERT M. GLOVER, F.R.C.S. EDIN.,  
ACTING SURGEON, ROYAL INFIRMARY, DUMFRIES.

THERE are no diagnostic distinctions between this form of diverticulitis and acute appendicitis. But immediate operation is necessary in acute appendicitis, and if the comparatively rare condition of acute diverticulitis (Meckel) is present it can be recognised and dealt with.

The patient, aged 27, was admitted to the Dumfries and Galloway Royal Infirmary on July 19th, 1915. He was referred to me by Dr. M. Bryson, Thornhill, with a diagnosis of acute

appendicitis. There was a history of seizures on several occasions, each one being typical of acute appendicitis. On the present occasion he had apparently suffered from a similar attack, and Dr. Bryson advised immediate operation.

On examination the patient presented the usual signs and symptoms of an acute suppurative appendicitis, except that localised abdominal tumidity and tenderness were situated rather higher and nearer the middle line than usual. These points, of course, would not impress one that the case was other than an acute suppurative appendicitis with the appendix probably pointing upwards and inwards, and my own diagnosis therefore agreed with that of Dr. Bryson.

At operation, a few hours after admission, I opened into a localised abscess cavity with an extension downwards towards the pelvis, and faecal-smelling, dark-coloured pus at once escaped. When the pus had been removed I observed a long tube lying free in the abscess cavity. The tube was about 7 inches long, rather thicker than an average appendix, had no mesentery, and originated from the ileum. About 1 inch from its intestinal origin it was dilated to the shape and size of a tangerine orange. The bulbous part was gangrenous, black in colour, stippled with greyish points. The intestinal ostium of the tube was about 1 inch in diameter. Distally the tube tapered away to a thin fibrous cord which disappeared backwards amongst adhesions. I did not identify the appendix, as I thought it unwise to disturb adhesions in any attempt to do so. But without doubt I was dealing here with a persistent, patent, inflamed, and gangrenous Meckel's diverticulum. I removed the diverticulum. The wall of the tube was quite sound for about half an inch from the bowel, and so the opening could be securely closed.

Recovery was uneventful, the patient being discharged from hospital in three weeks.

On examining the tube afterwards the dilated part was found to be full of thin fluid faeces, and the greyish points on the outer surface corresponded in position with small faecal concretions adherent to the inner surface.

It was fortunate that a localised abscess had formed here. If that had not occurred, and operation had been at all delayed, rupture of the dilated part with copious extravasations of faeces would certainly have eventuated, and, according to statistics quoted by Jacobson, few of such cases recover—as might be expected.

Dumfries.

## Medical Societies.

### ROYAL SOCIETY OF MEDICINE.

#### SECTION OF OPHTHALMOLOGY.

*Exhibition of Cases.*—*Fur Infection of Human Conjunctiva from Cats.*—*Retinal Signs of Arterio-sclerosis Compared with those of Increased Blood Pressure.*

A MEETING of this section was held on Feb. 7th, Mr. WILLIAM LANG, the President, being in the chair.

Mr. G. HARTRIDGE showed a drawing of a case of Probable Rupture of the Optic Nerve. The patient, a member of the Royal Flying Corps, suddenly fainted while flying and remembered nothing more until five days later. An observer said that in the last 500 yards of the fall the machine was vertical, and it was smashed. The airman sustained serious damage to the left arm and right eye. Apparently there was no skull injury. When seen three weeks after the accident extensive subconjunctival haemorrhages were found in both eyes. In the right eye there was no perception of light, the pupil was widely dilated, and the vitreous was so filled with blood that no details of the fundus could be seen. There was a small wound of the upper lid. A small probe revealed no foreign body. The vision of the left eye was 6/5; fundus normal.—The PRESIDENT mentioned a similar case in a boy who had a clothes-prop poked into his eye.—Lieutenant-Colonel R. H. ELLIOT commented on the surprising escape of the patient from death, which was probably due to the brunt of the fall having been taken by one of the wings of the machine. He saw one man whose machine fell 150 feet, and all that could be seen was slight ecchymosis of the conjunctiva, and his pilot said he believed he had sprained his ankle!

Mr. H. B. GRIMSDALE showed a case of Congenital Absence of Choroid.

Mr. ARNOLD LAWSON read a paper on Fur Infection of the Human Conjunctiva from Oats, giving an account of three cases. The first patient was a girl of 15 years, who had a pet Persian cat which she fondled a great deal. One

day, after burying her face in its fur, her eyes became suffused and she had a severe sneezing fit. The next day the eyes were swollen, and a purulent discharge was exuding. The nostrils were also swollen, and purulent sanguineous matter was issuing from them. Cultures were made from the child's discharge and from the cat's fur, and *Staphylococcus aureus* was found in abundance. Energetic treatment resulted, without permanent damage to the eyes. The cat was, of course, destroyed. The second case was that of a boy aged 14 years, and was complicated and severe. A fortnight before Mr. Lawson saw the boy he had swelling of the left eye, and of the glands of the neck, the local practitioner diagnosing mumps. It did not run the usual course of mumps; there had been no fever or pain. When seen there was a brawny swelling over the parotid and into the neck, and the lids of the left eye were considerably swollen, with inflammation of the conjunctival surface of both tarsi. A muco-purulent discharge was exuding from the furrows of the swollen tissues. Tuberle seemed improbable on account of the rapidity of the development. The boy had been in the habit of walking about with his pet Persian cat perched on his left shoulder and cuddling it. The patient was anaesthetised and the condition treated by cutting, scraping, and swabbing with 2 per cent. silver nitrate. Six weeks' treatment was required and the glands did not subside for three months. The scrapings were cultivated and revealed *Streptococcus longus*, *Streptococcus brevis*, and *Staphylococcus albus*. A dog in the house and the cat were examined, and the latter was proved to be the culprit. The third, and most severe, case was that of a girl aged 5 years, who was staying with friends at a farm. She developed muco-purulent conjunctivitis of a mild type after nursing a favourite cat, which divided its attention between the house and a cowshed. After a time the neck glands were involved in a serious degree. The upper lid showed an exuberant mass of cock's-comb granulations, especially on the retro-tarsal tissue. He suspected conjunctival tubercle. He cut and scraped away all the infected parts, and treated the residue with mitigated nitrate of silver stick. An excellent recovery ensued after three small operations in the course of the next three months. There had been no recurrence in eyes or glands. Mr. Browning pronounced it to be the bovine type of tubercle bacillus. Scrapings injected into a guinea-pig resulted in rapid wasting, and death within a fortnight. The owners refused to allow the cat to be examined. Mr. Lawson pointed out how great a danger cats were in this respect, especially among children, though, because of its habit of licking itself, and thus distributing its saliva, it was popularly regarded as a cleanly animal.—Mr. M. S. MAYO remarked that tubercle was a common disease among cats.—Dr. ETTIE SAYER referred to a case of tuberculous infection of the eye from a pet dog.

Mr. P. C. BARDSLEY read a paper on the Retinal Signs of Arterio-sclerosis Compared with those due simply to Increased Blood Pressure. The late Mr. Marcus Gunn, in Vol. XVIII. of the Ophthalmological Society's Transactions, published his great work on the retinal signs of arterio-sclerosis, and since that date but little had been added. The four cardinal signs therein laid down were: (1) a tendency to tortuosity of the arteries, especially smaller vessels; (2) variation in the calibre of the vessels, especially sudden diminution over a short length; (3) alteration of the normal light streak, which became brighter and more sharply defined; and (4) indentation of veins. Sometimes the changes developed rapidly, especially after influenza, scarlet fever, or other toxæmia, vision being at the same time reduced to 6/12. Mr. Bardsley said he could not believe that advanced fibrosis could have occurred in a day or two. Lowering of the blood pressure brought about an improvement in the appearance and cessation of the headaches which accompanied the high pressure. He submitted that the following were the indications of simple high tension without real arterio-sclerosis: (1) the vessels appeared to be uniformly distended; (2) the light reflex was broadened out, and might apparently reach the whole width of the vessel; (3) the light streak was increased, but did not look like silver wire; and (4) the tight arteries indented the veins deeply in very high tension, leading to back pressure. He concluded by pointing out the pitfalls of which persons unskilled in the use of the ophthalmoscope might not be aware.—Mr. HERBERT PARSONS referred to the recent work on the subject by Mr. Foster Moore.—Mr. J. B. LAWFORD said

he was a colleague of the late Marcus Gunn when he was making investigations. Since that time his observations convinced him that the prognosis in these cases was not always as bad as Mr. Gunn considered. He had seen a number of cases—some of them having been under Mr. Gunn's care—get much better. There were ophthalmoscopic changes, not very different from those of arterio-sclerosis, which had not nearly the same grave significance as those of the actual disease.—Mr. D. LEIGHTON DAVIES said that in examining a number of old people in Cardiff Workhouse he was struck by the very slight signs of retinal arterio-sclerosis. The most pronounced and constant sign was redness of the disc. He seldom saw any marked indentation of veins, although the systolic pressure was often over 200 mm. and the diastolic 140 mm. He found it very difficult to give a prognosis as to the duration of life in these cases.

## Reviews and Notices of Books.

### *Formes Cliniques des Lésions des Nerfs.*

By Mme. ATHANASSIO-BENISTY. Paris: Masson et Cie. 1916. Collection Horizon. Pp. 240. Price 4 fr.

A PREFACE by Professor Pierre-Marie introduces the author of a well-written and useful treatise on nerve injuries. Commencing with a brief description of the methods used in a routine neurological examination of a limb, the various forms of injury met with in their clinical aspects are systematically described, the text being fully illustrated by numerous excellent photographs and diagrams. A further second volume on treatment and restoration of function of nerves is promised as a sequel.

We note that in the description of the examination of nerves by electro-diagnosis of the paralysed muscles no mention is made of the use of condenser currents, which has recently become a favourite method with several practitioners in this country, who assert that it provides a more accurate and certain means of determining the exact condition of the damaged nerve than the older and well-tried methods of faradism and galvanism. A sound chapter is devoted to the discussion of painful injuries of the nerves, when reference is made to the fact, well known to all who have worked in neurology during the present war, that the median and internal popliteal nerves suffer particularly in this way. The author suggests as accounting for this fact, that the palm of the hand and the sole of the foot are the cutaneous areas supplied by these two nerves, and that they are the two areas above all others which are liberally provided with touch corpuscles and similar end-organs for sensory stimulation. These painful affections of the hand and foot were named by Weir-Mitchell long ago "causalgia," and over the derivation of the word the author's Greek fails her. The burning pain in the hand, with bursting tearing sensation in the finger-ends, is well described, as are also the accessory factors that will start or aggravate the paroxysms of pain, such as dry heat, scraping noises, coughing, sneezing, laughter, and most sudden emotions, Madame Athanassio-Benisty omits to mention what in our experience is the worst enemy of sufferers from causalgia—in military hospitals, at least—namely, the gramophone. The pain usually reaches its maximum some few days or weeks after the injury, though some pain dates from the moment of the wound. The hand or foot often sweats profusely and is hot and reddened, or even cyanotic, while the application of cold water and keeping the limb raised relieve the pain. Atrophy of the whole hand, skin, muscles, and the finger pulps, with incurving bridged nails are evidences of the trophic damage, while skiagrams exhibit an osteoporosis of the bones of the hand or foot. This painful trophic condition never occurs with severe lesions of the nerves, and anaesthesia is always very slight if present, while operations on the damaged nerves have shown only slight compression by fibrous scar or congestion and oedema of the nerve. Surgical interference rarely relieves, though alcohol injection of the nerve above the lesion may give excellent results. The pathology of the condition has been suggested to be due to an associated vascular lesion in the arm or leg, but this cannot be the case, for injuries at a distance from any vessel of importance may produce the disease. The author considers that we may be dealing with a neuritis of the sympathetic branches accompanying the nerve-

trunks. The lesions of the brachial plexus are fairly fully dealt with as regards motor and sensory paralysis; nothing is, however, said of operative procedure. This, in our experience, is rarely of any real value in injuries of the plexus from bullet wounds, owing to the large amount of scar-tissue which cannot be prevented from re-enveloping the nerves.

Full accounts are given of the anatomy of the sciatic nerve and its injuries, with excellent figures of the cutaneous nerve-supply of the lower limb, while lesions of the lumbosacral plexus and a description of cranial nerve injuries complete a useful and carefully written volume.

#### *Care and Feeding of Infants and Children.*

By WALTER REEVE RAMSEY, M.D., Associate Professor of Diseases of Children, University of Minnesota, U.S.A. With 123 illustrations. London and Philadelphia : J. B. Lippincott Company. 1916. Pp. 290. Price 9s.

This work is primarily written for nurses, but, in this country at least, it is well adapted for use by average health workers, and among them it should become popular, for the reason that greater notice is given to the preventive side of medicine than to the curative. Pathology, diagnosis, and treatment by drugs find little place in this volume; but when occasion warrants, sufficient attention is paid to these scientific aspects of medicine to make the rationale of professional management clear to the nurse.

The lines of management suggested in these pages agree very closely with those now taught in our well-conducted welfare centres; and the author shows himself to be commendably free from fads and fancies, but by no means adverse to the giving of "tips," if the expression is permissible, for nursing and sick-room technique. His suggestions for improvising means for collecting specimens of urine in the case of young infants, for strapping the protuberant umbilicus, for the breast-feeding of weakly infants, and so on, are excellent. We cannot, however, agree with his view that an adherent foreskin had better be left alone in the hope that it will right itself. There are naturally degrees and varieties of adhesions, but the *laissez-faire* policy is not a good one. On page 55 we notice views on the question of mouth-breathing in infants to which we cannot altogether subscribe. The author claims that mouth-breathing in quite young infants is due to the presence of a large post-pharyngeal tonsil. We submit that it very seldom starts in this way; in young infants the adenoids are more often the necessary consequence of mouth-breathing. The author, in our opinion, greatly understates the possible sequelae of painful dentition. He says the teeth are always growing, therefore exacerbations of symptoms are wrongly ascribed to teething; but if there is one thing that is quite clear about the growth of teeth it is that it is subject to pauses and periods of accelerated development. On page 87 we notice the old fable that during the siege of Paris infant mortality was low; recent evidence proves that the mortality during this time of anxiety was enormous. In more than one connexion the author refers to the condition of tongue-tie as if it were an abnormality due to peculiarities in the growth of the frenum linguae; surely the shortness of this fibrous structure is generally, if not always, due to some incapacity on the part of the infant to extrude the tongue—namely, in some want of neuromuscular coöordination. If the tongue can be, and is, properly extruded the frenum grows in accordance with the requirements. These are, however, minor matters, and on the thoroughly good common sense and rational advice offered for the management of infants and children we congratulate Professor Ramsey.

#### *Clinical Bacteriology and Haematology for Practitioners.*

By W. D'ESTE EMERY, M.D., B.Sc. Lond. Fifth edition. London : H. K. Lewis and Co. 1917. Pp. 310. Price 9s. net.

THE late Sir Michael Foster once warned a friend never to write a text-book, as "if it is a success, it is a millstone around your neck for the rest of your life." Dr. Emery will assuredly carry his millstone so long as he continues to provide the practitioner with the lucid and up-to-date information contained in this book. In this edition he has gone a little beyond what the peace-time practitioner requires, and has included such things as Dreyer's method of agglutination with the Oxford Standard Cultures and McIntosh and Fildes's method of complement fixation; this is a good departure, as it is

wise for every medical man to understand the principle of these important tests. It is also open-minded, as Dr. Emery does not himself believe that it is necessary to add complement at all for the Wassermann reaction. Many recently qualified men have acquired a turn for laboratory methods which will, it may be hoped, never leave them, and they will find these inclusions of considerable service to them. The value of a book of this kind opens up indeed an interesting question of medical politics. The surgeon uses the operating theatre, speaking roughly, as his workshop to verify the opinions given in the consulting-room, and the physician of the future will do something to equalise his opportunities if he has a handicraft of his own. Probably this was in Sir Clifford Allbutt's mind in winding up a recent discussion on the relation between physician and surgeon. Dr. Emery's book is an excellent guide to the physician's handicraft. *rec*

## New Inventions.

### IMPROVED APPARATUS FOR INTRAVENOUS INJECTION.

WHAT is known as the "military" apparatus for intravenous injection has met with much favour. It has, however, some minor disadvantages, which are, I think, remedied in the modification shown below.

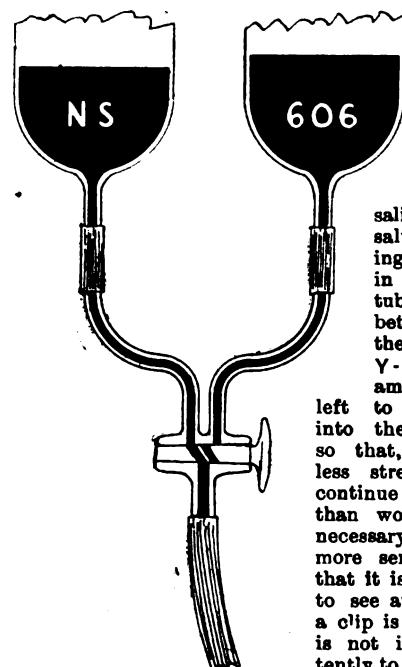
In the usual arrangement the two graduated barrels for normal saline and salvarsan respectively are connected with the arms of a glass Y-piece by two lengths of rubber tubing each bearing a metal clip.

When the dose of salvarsan has been run off from its barrel, one closes the clip of that side and opens the other to let the normal saline wash out the salvarsan still remaining in the tube. But in the portion of tube that intervenes between the clip and the junction of the Y-piece a certain amount of salvarsan is left to diffuse gradually into the flowing saline; so that, to get a colourless stream, one has to continue the saline longer than would otherwise be necessary. A second, and more serious, objection is that it is by no means easy to see at a glance whether a clip is open or closed. It is not impossible inadvertently to leave both open at once—an accident which will, if the levels of the liquids in the barrels are different, lead to a mixture of the two fluids, with the result that the whole of the material will be wasted.

To overcome these difficulties I had a special glass Y-piece made with a three-way tap at the junction. The arrangement will be easily understood from the diagram, which shows both fluids as dead black. In the position illustrated the normal saline is flowing. It is evident that if the tap is turned through two right angles the saline will be cut off and the salvarsan will flow. In any intermediate position both are cut off. Mixture of the two fluids is thus impossible. Then when the change from salvarsan to saline is made, there is no reservoir of salvarsan to contaminate the saline. There is besides a small gain in the fact that one movement effects the change of fluids.

An experience of some months convinces me that this little device, which has been made for me by Messrs. Baird and Tatlock, Charles-street, Hatton Garden, E.C., does, to an appreciable extent, make for efficiency and convenience; and I therefore think it worth description.

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# THE LANCET.

LONDON: SATURDAY, MARCH 3, 1917.

## The Mobilisation of the Medical Profession.

FROM previous articles which have appeared in these columns it must be apparent to our readers that a very important, if not critical, position has been reached in the medical profession with regard to the supply of doctors for the Army. At least three months ago it became obvious to many that the question whether the medical profession should or should not mobilise itself voluntarily was urgent, and how rightly the situation has been gauged was proved more recently by the statement of the Prime Minister, who, when speaking of the responsibility now lying upon the whole population for active prosecution of the war, intimated that where voluntary mobilisation in any section of that population did not fulfil expectations compulsory powers would have to be sought. The intention of the present Government to ensure that every man in the country during these our critical times should give his help, how, when, and where best qualified was thus openly avowed. Therefore, and immediately on the creation of the National Service Department, Mr. NEVILLE CHAMBERLAIN, the Director-General of that Department, was approached by the Central Medical War Committee, the Committee of Reference of the English Royal Colleges, and the Scottish Medical Service Emergency Committee with a view to an early interview. It was felt that a joint representation should be made as promptly as possible to the Director-General by the three statutory bodies upon whom the double duty had devolved of keeping up the necessary supply of medical officers for the Navy and Army and of watching lest the civilian population should be dangerously depleted of professional assistance. In the event the Scottish body was not present at the interview, which was duly granted, but the Director-General has since been placed in possession of its opinions.

Early in February Mr. NEVILLE CHAMBERLAIN made a statement as to the direction in which his plans might be expected to mature, so as to obtain from the general population services of all kinds, and in the course of this statement, referring to medical men, he said: "We have to see that the doctors are so mobilised and distributed that the needs of both the civil population and the Army can be met, and that, so far as possible, specialists can be put to do the work for which they have taken pains to fit themselves." This was to a great extent the object which the three statutory bodies had set before them, and it was felt generally that Mr. NEVILLE CHAMBERLAIN could practically carry out his plan of campaign, as far as the medical profession was concerned, by availing himself of the existing organisations, with their considerable experience and accumulated stores of information. The Director-General of

the National Service Department has now written to the three statutory bodies saying that as the organisation of the medical profession, with a view to meeting the needs both of the military and civil population is one with which his department is concerned, he desires to have a conference with their representatives. "Up to the present," he adds, "the work of providing the Army with qualified medical men has been undertaken by the Central Medical War Committee with the assistance of the Committee of Reference for England and Wales and the Scottish Medical Service Emergency Committee. It is clear, therefore, that in considering what further steps should be taken these bodies should be consulted and their opinions fully considered. Accordingly, I have decided to call a conference comprising three representatives of the Scottish Medical Service Emergency Committee, four from the Central Medical War Committee, and two from the Committee of Reference, over which I have asked Sir DONALD MACALISTER, the President of the General Medical Council, to preside." The statutory bodies are asked to nominate representatives from amongst their number to attend the conference, when the problems that have been presented frequently in these columns will be discussed, beginning with the vital question of whether the service to be rendered by members of the medical profession should be voluntary or compulsory. The three statutory bodies have pronounced so far in favour of the view that sooner or later some form of compulsory arrangement will be found to yield the best and fairest results.

At a conference held recently of the committee and the secretaries of the Local War Committees for Scotland a resolution was adopted unanimously affirming that further substantial calls are likely to be made on the medical profession which can only be met by mobilising the whole profession. But the issues in Scotland are less complicated than they are in England, where the redistribution of medical men, centrally or locally, must often be a matter of extreme difficulty. The financial aspects of national service for medical men in many parts of England will require very careful handling, whether we consider whole-time or part-time work; and the sacrifice of the medical man who holds a commission with its dangers and emoluments must be fairly compared with that demanded of the civilian medical man under all forms of substituted practice. Because the considerations that will here arise are so many and may be so delicate, we welcome Sir DONALD MACALISTER as chairman of the Conference proposed by Mr. NEVILLE CHAMBERLAIN. The President of the General Medical Council has acquired by his long connexion with the Council an unrivalled knowledge of our professional life, and in any discussion under his guidance no room will be found for irrelevancies, while the minimum of time will be spent in explanations of the unimportant, or repetitions of the well-known. It is hoped that there will emerge from the Conference a plan of campaign and the necessary authority to secure its working.

## The Restitution of the War Cripple.

As the war drags on, and the possible shortage of supplies of all other kinds gives rise to anxiety, the supply of maimed and crippled men continues unabated and the problem of their restitution becomes a larger and larger one. Something of the magnitude of the problem has now been realised by the authorities, and the chief stumbling-block to its effective solution lies in the conflicting destinies of the two main groups of disabled men: those whom treatment can restore to efficiency as a fighting unit, and those whose military value no longer exists but whom it would be base ingratitude not to restore to the highest possible grade of civilian efficiency. Stated thus on paper, the division appears to be a precise one, and one for which arrangements could readily be made, dealing with the group of disabled but restorable soldier in the military hospital and convalescent camp, and providing immediate discharge of the non-restorable soldier for treatment and re-education as a civilian worker. In practice the distinction has so far been found quite impossible to make. Many apparently minor conditions prove unamenable to treatment and lead to ultimate discharge from the Service, while grave disabilities—short of blindness, deafness, and injuries requiring amputation—under patient and appropriate treatment have not prevented a return to military efficiency. Nor has the difficulty of distinguishing the two groups been attended with any serious drawback to either class. Whatever the ultimate result of treatment may prove to be, the same medical care, the same physical means, and the same moral control are the curative factors in both cases. Further than this, the particular methods of manual training desirable for civilian efficiency have been increasingly found to be more curative than ingenious exercises designed to produce the correct quality and quantity of muscular movement, but devoid of useful concrete results. The apparatus may be physically perfect; the manual training has psychic factors which are essential.

Take, for example, the life of a man who has to stay some months in a Command Depôt after his wound or his shock has allowed him to leave the Military Hospital. He rises at 6.30 A.M. and goes to bed at 10 P.M. or later. His treatment may occupy half an hour daily, his physical training another half hour, route-marching an hour more towards the latter part of his stay. Much spare time remains for the flesh and the world, if not the devil, to appropriate. How can this man's time—whatever his immediate future—be better employed than in learning something which will be useful to himself and his country, provided, of course, that the learning does not interfere with his treatment? The problem is one that has had to be faced in all combatant countries, and it may not be amiss to record the official German attitude, as shown in the remarks of a lecturer at a course of military medicine at Düsseldorf. "We could not," he says, "have foreseen in peace times the tremendous importance of employing, besides purely medical methods, special means to occupy the sick and wounded in

hospital in order to accustom them again to work and send them back more readily to their occupation. Repeated and detailed instructions have been issued on this point. The sick and wounded are not to be discharged from the Service until they have reached the highest possible degree of recovery of function. In view of the prolongation of treatment thus entailed it is essential to protect the inmates of hospital beds from long months of idleness which may make them more or less work-shy, quite apart from the fact that in many cases appropriate manual training is directly designed to assist their cure and to assure the attainment of what I may term the social aim of treatment. Experience shows that many men require a certain external pressure to keep them at actual work, even though this is light. The appearance of compulsion must, of course, be avoided, and the aim be to lead them by easy stages to more useful and arduous work, finally bringing them to the point of finding real enjoyment in their recovery of working ability." The important work of the Military Hospitals Commission in Canada, recorded in the Third Bulletin,<sup>1</sup> dated December, 1916, emphasises the same essential point of view. The disabled Canadian is to be made, physically and mentally, as efficient as possible while still under military oversight.

Such being the essentials for the war cripple's restitution, there must be some well-considered reason for the issue of an Army Council instruction to discontinue workshops and the teaching of trades and occupations in military hospitals, camps, and dépôts, an instruction which was—as we noted last week—described by Lord H. CAVENDISH-BENTINCK in the House of Commons as a retrograde and reactionary step. It is impossible that the Army Medical Service does not recognise the value of such workshops and teaching, and the explanation can hardly be other than that the provision of these essential things in some different way is in contemplation. Methods and technique require some backing of authority and discipline to be fruitful of result, and discipline must remain an essential part of any effective scheme. The statement and recommendations just issued by the Committee of Council of the Section of Balneology and Climatology of the Royal Society of Medicine, which we print on p. 348, come at an opportune moment. The committee express the hope that the problem is now approaching a solution. They see the necessity of an adequate and well-ordered system of physical treatment for every disabled soldier before his discharge from the Service. They regard physical treatment as the thing most needed to prevent the formation of an army of cripples in this country. And they recommend the establishment throughout the country of centres of physical treatment on an adequate scale and wherever possible in association with general hospitals, so that other forms of special treatment and diagnosis may be readily available, and in close association with centres of re-education. Whatever the solution decided upon the problem brooks no delay.

<sup>1</sup> Military Hospitals Commission Bulletin, 24, Vittoria-street, Ottawa, Canada.

## Annotations.

*"Ne quid nimis."*

### THE SUPPLY OF MEDICAL STUDENTS.

WE have received from the General Medical Council the following tabular statement showing the number of students in actual attendance on courses of instruction in preparation for medical degrees or diplomas:—

*January, 1917.*

Topical distribution.	First year qualifying in 1921.			Second year qualifying in 1920.			Third year qualifying in 1919.			Fourth year qualifying in 1918.			Fifth year qualifying in 1917.		
	Men.	Women.	Total.	Men.	Women.	T. tal.	Men.	Women.	Total.	Men.	Women.	Total.	Men.	Women.	Total.
London (only)	217	174	391	183	133	316	71	54	125	229	44	273	425	51	476
England	602	325	927	374	210	584	175	99	274	34	68	409	539	78	617
Scotland	366	239	605	235	184	419	180	131	311	314	74	388	359	71	430
Ireland	481	110	591	378	78	456	217	31	248	19	22	218	190	15	205
Total	1449	674	2123	987	472	1459	572	261	833	851	64	1015	1088	164	1252

*May, 1916.*

London	251	122	373	145	68	213	43	44	87	479	39	518	269	38	307
England	558	226	784	280	109	389	140	65	204	619	71	690	375	55	430
Scotland	404	311	715	267	154	421	213	80	29	258	55	313	366	74	440
Ireland	460	99	559	36	32	268	166	18	184	201	19	20	181	11	192
Total	1422	636	2058	783	295	1078	519	163	683	1078	145	1224	922	140	1062

The total number of students in attendance in May, 1916, was 6103. The total number of students in attendance in January of this year was 6682.

### THE ULTIMATE RESULTS OF SANATORIUM TREATMENT.

ALTHOUGH the War has deprived the King Edward VII. Sanatorium at Midhurst of its medical superintendent and its pathologist, partial compensation, as the report for the year 1915–16 shows, has been provided by a grant made on the recommendation of the Medical Research Committee in aid of the statistical researches carried out at the sanatorium. As is well known, the primary difficulty in regard to all extensive statistics of sanatorium results is that so many patients are lost sight of after the first year or two following on their treatment. With the employment of a special officer to follow up these cases the gratifying result has been achieved that a greater number have been traced in the last year than at any time previously. This has the curious result in the tables that more patients of a certain past year are "well" or "alive" in 1916 than was the case in 1915 or 1914. An improved system of investigation has redeemed them from the ranks of the "lost sight of" and has thus enhanced the reputation of the treatment they had received. Taking the first complete year, 1907–08, in which the sanatorium had its full complement of patients, and tracing the history of the 206 patients discharged during this period whose sputum gave positive result in the sanatorium, 71 were known to be "well" or "alive" in 1913, and 70 of these were still alive in 1916. Picturing this result in the form

of a curve we note that the numbers still living in each successive year after discharge rapidly fell for five years, to remain level for the next years, and, we may presume, indefinitely. The observation is practically the same whatever the severity of the disease was at the time of treatment. Naturally a smaller proportion of the advanced or Group 3 cases survived, but the deaths occur within five years of discharge, and the statistics suggest that after having survived his course of treatment for five years the tuberculous patient has a good prospect of continuing to live indefinitely, whatever was the condition of his lungs at the time of his cure.

### THE INTRAVENOUS ADMINISTRATION OF QUININE.

UNTIL the extermination of the mosquito is complete quinine must continue to hold its place in malarial countries as a prophylactic and curative agent, and in cases in which it is not tolerated by the stomach, or it is desired to obtain an immediate and powerful effect, the intramuscular or intravenous administration has to be considered. Intramuscular injection is painful and may give rise to points of local necrosis, but is generally held to be safer than the intravenous route, although in either case the injection of tetanus spores should not be lost sight of. Speaking from a very large experience amongst African troops during 1915, M. Braun, director of the Maroccan Service de Santé, states<sup>1</sup> that ampoules containing 0·4 gm. of quinine hydrochloride in 1 c.c. of excipient, being non-isotonic and caustic, are liable to cause abscess at the site of intramuscular injection. Baccelli, who employed intravenous injection with much success in pernicious cases of malaria, used a solution made up as follows: Quinine hydrochloride, 1 gm.; sodium chloride, 0·75 gm.; distilled water, 10 gm. Apparently the fear of producing clotting in the vein is the chief drawback to this method, and in a paper<sup>2</sup> by Captain A. C. MacGilchrist, I.M.S., this risk is fully considered, as well as the possible production of haemoglobinuria. Captain MacGilchrist concluded by advising a very dilute solution for intravenous use—viz., 7 grains of bi-hydrochloride in 2 to 3 pints of saline fluid. The work of three physicians, Dr. German Arellano, Dr. F. G. Miranda, and Dr. Fausto Robleto, at the San Juan de Dios Hospital in Granada, Nicaragua, suggests that Baccelli was right and that concentrated solutions of quinine can be injected safely into a vein. They have gone even further and find that the solution need not even be isotonic with the blood serum. Dr. Arellano and his colleagues speak of being daily confronted during the rainy season with rapidly fatal forms of pernicious malarial fever,<sup>3</sup> and have found nothing so efficacious in the face of impending death as the intravenous injection of quinine. Concerning its administration they write:—

The first time that we employed this method with the happiest and most successful results, we were able to use Parke Davis and Co.'s solution of quinine in sodium chloride and other salts; but unable to obtain the isotonic ampoules, we had no choice but to use the acid non-isotonic solutions of the chloride, bichloride, and chlorhydro-sulphate of

<sup>1</sup> Le Paludisme au Maroc en 1915, Arch. de Méd. et de Pharm., November, 1916.

<sup>2</sup> THE LANCET, 1911, i., 1221.

<sup>3</sup> Whitaker's Almanack, with unconscious humour, gives the population of Nicaragua as 620,000, "of whom about three-quarters are mixed Indian and the rest Indians, besides the Mosquitos, who are mostly in a savage state." [The italics are ours.]

quinine, as supplied in ampoules by Parke Davis and Co., Clin of Paris, and others, diluted with an equal volume of warm sterile water. The results are simply marvellous and we have never had the least trouble or accident. So sure, safe, and efficient do we consider this method to be that we employ it now even in cases showing no signs of perniciousness. The patients merely complain of tinnitus, deafness, transient nausea, and a sense of heat spreading all over the body within one to ten minutes after the withdrawal of the needle.

In all cases of pernicious fever we have found the worst symptoms, such as amaurosis, convulsions, algidity, and collapse, to disappear from three to six hours after the injections, though cases have occurred in which the patient was out of danger within the hour. The dose we employ is from 10 to 25 or even 50 centigrammes, according to the age, state, condition, and symptoms of the patient. Children are also subjected, when the veins are accessible, to the same treatment. In fact, in children it works wonders. Now, as it may be asked why we have not used Baccelli's formula, we will frankly state that in this town there are no pharmacies really reliable in which such solutions might be aseptically prepared, a fact which has led us to give preference to solutions which, acid though they be, are most certainly aseptic and exactly dosed. The technique we employ is as follows: We mix the solution within the syringe with an equal amount of sterile warm water, taking care that no precipitate or coagulum is formed as the blood comes in contact with the solution. It has been observed at times, especially when time is lost in inserting the needle, that a kind of flocculent precipitate is formed very similar to that of "aluvine" when injected intravenously; but, as in that case, experience has shown it to be perfectly safe, it being a sort of emulso-suspenoid.

The authors add that at first their procedure was severely criticised by their local colleagues, and in the daily press, until continued experience showed its safety. They offer no explanation of the non-coagulability of the blood by the acid non-isotonic solution, but commend other workers to test the fact for themselves.

#### INTESTINAL OBSTRUCTION DUE TO ASCARIDES.

Dr. J. M. Perret and Dr. H. T. Simon have reported in the *Journal of the American Medical Association* of Jan. 27th a case of intestinal obstruction due to a very unusual cause—a mass of round worms. During the latter half of the nineteenth century opinion was divided as to the possibility of *ascaris lumbricoides* being the cause of intestinal obstruction. Thus, Leichtenstern and Sir Frederick Treves opposed this view, while Troussseau, Bretonneau, and Stutz upheld it, each having been among the first to report cases. Bordoroni and Stepp in 1887 reported two cases, both of which were confirmed post mortem. Simon in 1892, while holding a necropsy in a case of intestinal obstruction, found the cause to be a mass of round worms. Botoff in 1897 reported a case of obstruction, perforation, and peritonitis, in which the necropsy revealed the presence of 500 round worms. An American surgeon, Van Meter, reported the case of a child, aged 5 years, with a sausage-like mass above and to the left of McBurney's point in which operation revealed in the lower part of the ileum a coil of round worms causing complete obstruction. The patient recovered. In this country Mr. D. H. Vickery reported the case of a woman with symptoms of intestinal obstruction and a history of vomiting several round worms. After a dose of santonin, followed by castor oil, she vomited 12 round worms. The symptoms of obstruction disappeared, and excepting for the sudden termination of gestation she made an uneventful recovery. Dr. Perret and Dr. Simon report the following case. A girl, aged 8 years, was sent to hospital for operation with the diagnosis of acute intestinal obstruction. The family history was of interest, as the patient's five sisters and brothers had passed round worms on many

occasions. The child herself had frequently passed round worms since the age of 2 years. Five days prior to admission she was seized with a pain in the right lower abdominal quadrant, accompanied by slight elevation of temperature. On the second day she began to vomit clear watery fluid, and this continued up to the time of admission. A dose of castor oil was given the second day, but only a small stool was passed. On admission the temperature was 101° F. The child was poorly developed and nourished. The skin was of a slight sallow tint. The glands in neck and groin were enlarged. The eyes were sunken, with dark hollows under the orbits. The tongue was dry and coated. Coarse mucous râles were heard over the lower half of the right lung, both anteriorly and posteriorly. The abdomen was distended and tympanitic. In the left lower abdomen, in the region of the sigmoid, a mass the size of a large lemon was felt. An enema was given, and returned coloured with faecal matter and containing a mass the size of a child's closed fist consisting of approximately 40 round worms, coiled and interwoven together. A second enema was given, and returned highly coloured with faecal matter. The distension was relieved, and excepting for a rise in temperature for 8 hours the patient improved, and in 12 hours the temperature was only 99.6°. She continued to improve, and except for an acute bronchitis, which she developed about the seventh day, recovery was uninterrupted. Most cases of intestinal obstruction due to round worms have been diagnosed at the necropsy or on the operating table. Only seldom has the mass of worms been expelled through the natural channels, as in the present case.

#### PROHIBITION AND THE DRINKING OF METHYLATED SPIRIT IN RUSSIA.

IN recent discussions on the drink question reference has frequently been made to certain untoward results which are alleged to have followed the prohibition of the sale of vodka in Russia, the most serious of these results being the increasing use, in lieu of the prohibited beverage, of such dangerous substitutes as methylated spirit and varnish. The extent to which this pernicious practice has developed is, from the nature of the case, somewhat difficult to determine, but that it is sufficient to justify considerable anxiety is clear from the rise in the number of deaths from alcoholism in the larger towns, and also from the increasing frequency of cases of toxic amblyopia due to methyl alcohol poisoning since the enforcement of the new policy. In his "Self-Discovery of Russia" (Constable and Co., 1916) Professor J. Y. Simpson quotes some striking data referring to both these points from a report on "The Results of Compulsory Prohibition and New Forms of Drunkenness," made by Dr. Alexander Mendelson to the Russian Society for the Preservation of National Health in March, 1915. Dr. Mendelson gives the number of deaths from alcoholic poisoning in the Obukhov City Hospital of Petrograd for the several months from July, 1914, to March, 1915, as follows: 52, 25, 27, 29, 33, 46, 56, 53, 36. The higher rates in the later months coincide with a great increase in the sale of denatured spirit and with a rise in the number of methyl alcohol drinkers in the hospitals. In the Eye Hospital in Petrograd there were treated 72 cases with impaired vision due to this specific

cause from July, 1914, to April, 1915. Previously such cases had been quite insignificant in number. Dr. Mendelson, who is a strong supporter of the prohibition policy, is of opinion that methylated spirit-drinking is practically confined to persons who were already of confirmed alcoholic habits, but this view appears to be disputed by other medical authorities. Thus, in the Russian Supplement of the *Times* of July 28th, 1915, extracts are given from an article contributed to the *Russky Wratch* by Dr. Novosolsky, in which the writer affirms that the use of methylated spirit and other substitutes is spreading amongst all classes of the population who formerly drank vodka, and this opinion appears to be in some measure confirmed by the observation that the alcoholics treated at the Obukhov Hospital for methyl alcohol and varnish drinking include persons of all ages and professions. The Russian Government is fully alive to the danger of this new drug habit, and is endeavouring to combat the evil by bringing the sale of denatured spirit under stricter control and also by adopting more effectual methods of rendering such spirit unfit for use as a beverage, but no evidence is as yet available to show to what extent these measures have proved successful.

#### THE PROGNOSIS OF GUNSHOT WOUNDS OF THE ABDOMEN.

LAST year at the Swiss Surgical Congress Professor Sauerbruch narrated his surgical war experiences in Germany, and as the text of this lecture has now come into our hands we may expand with advantage the summary<sup>1</sup> already given of his remarks on the treatment of gunshot wounds of the abdomen. Sauerbruch is convinced of the necessity of immediate operative interference in all gunshot wounds of the abdomen in which the peritoneum is involved, and believes that when this necessity is generally recognised the arrangements for carrying out the operations will readily be improvised at the front. He regards the external circumstances—the operation-room and the appurtenances of a theatre—as in general vastly overrated, holding that correct diagnosis, followed by immediate and technically correct operating, is the only factor which seriously counts. He refuses to speak, as is often done, of hopeless operations, in view of the consistently good results of early operation. It cannot be too much emphasised, he adds, that men who recover after abdominal injury retain an undiminished capacity for living and for working and do not swell the ranks of the war cripples. Sauerbruch therefore regards the operative treatment of gunshot abdominal wounds as precisely the most encouraging field of action for the military surgeon.

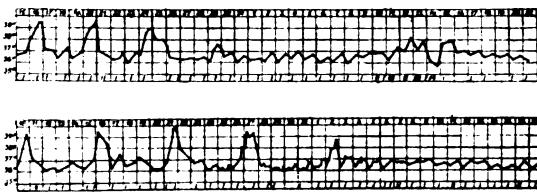
#### IDIOPATHIC DISLOCATION OF THE EYEBALL.

Dr. David M. Greig, of Dundee, records in the *Edinburgh Medical Journal* (Vol. XVIII., No. 2) a case of idiopathic dislocation of the left eyeball in a female child aged 11 months. The child was a neglected and badly nourished child weighing only 7 lb. There was no proptosis except when the child had screaming fits. Both eyes were then proptosed, the left more than the right, and on these not infrequent occasions the left eye often became dislocated forwards between the lids. It could not be retracted voluntarily, but was easily replaced by gentle pressure. Dr. Greig has been

unable to find any record in the literature of spontaneous dislocation of this nature, but we doubt if it is quite so rare as the absence of published cases would seem to indicate. In cases of extreme proptosis accompanying exophthalmic goitre dislocation forwards between the lids occurs very readily, and the same is true in some cases of oxycephaly, in which the orbits are very shallow. We have seen cases of this type of dislocation associated with very slight traumatism, where, indeed, the injury has been so trivial that one is inclined to attribute the displacement to the effects of sudden fright. In our experience these cases have always occurred in children; there has been practically no injury to the eye, which has been replaced in the orbit with the greatest ease.

#### ANOTHER SPIROCHÄTAL DISEASE.

EARLY in 1916 a febrile disorder was described by Werner and Haenseler as occurring on the German Eastern front, and named by them five-day fever or febris quintana, and by later observers febris wohynica. In the summer of 1916 a number of similar cases occurring on the Western front were known as Meuse fever. A paper by Dr. W. Thörner in the *Münch. med. Wochenschr.* for Dec. 12th last gives a concise account of the disease with two charts—which we reproduce—showing



the characteristic course of the temperature. Put briefly, the characteristic symptoms are: Sudden elevation of temperature without rigor, and defervescence without sweating; acute pain in the legs often requiring morphia, but without definite evidence of periostitis; an enlarged spleen sensitive to pressure; heart, lungs, digestion, and urine normal; polynuclear leucocytosis up to 20,000. The symptoms described need not be reproduced in greater detail, as they correspond exactly to the description of trench fever on our own front given by Dr. A. F. Hurst in THE LANCET of Oct. 14th last. The resemblance between the temperature charts given by the different authors is very striking. The German observers have devoted much attention to discovering the exciting cause of the fever. Werner thought he saw on one occasion a spirochete rather longer than the diameter of a red cell. Korbsch saw dancing cells and a suggestion of moving filaments amongst them. Töpfer observed short rods. Professor Riemer, who summarises these observations in the *Münch. med. Wochenschr.* for Jan. 16th, has now found spirochaetes very scanty in direct films, but fairly abundant after anaerobic culture for a week in blood serum. He gives micro-photographs showing an organism scarcely longer than the diameter of a red blood cell, with four turns, exceedingly mobile and difficult to see unstained, but readily taking up any anilin dye and decolorising with Gram. Some of the spirochaetes were longer, with a middle piece between the turns as though two spirals were intertwined. Attempts to infect guinea-pigs with the organism were unsuccessful, and Professor Riemer is too cautious to

<sup>1</sup> THE LANCET, 1916, I., 634.

assert that he has discovered the causal agent of the disease, although he believes that he has done so. The analogy with relapsing fever is evident. If his observations are confirmed, trench fever must be added to the rapidly growing list of spirochaetal diseases. Dr. Galli Valerio, from the Lausanne Hygienic Institute, has recently enumerated them as syphilis (*S. pallida*), yaws (*S. pertenuis*), relapsing fever (*S. obermeieri* and others), Weil's disease (*S. icterohaemorrhagiae*), bronchitis of Castellani (*S. bronchialis*), angina of Plaut-Vincent (*S. vincenti*), pyorrhcea alveolaris (*S. dentium* and others), and various spirochaetes associated with local venereal ulcerations. In our present issue Dr. J. W. Scott Macfie gives an account of another spirochaete (*S. eurygyrata*), an apparently harmless inhabitant of the human intestine on the Gold Coast. On all counts spirochaetosis is a subject of growing importance.

THE Hunterian lecture announced to be given before the Royal College of Surgeons of England by Captain Frank Cook, R.A.M.C., M.B., B.S., F.R.C.S., on Gunshot Wounds of Joints, their Pathology and Treatment, will be read in the theatre of the College to-day (Friday), at 5 o'clock P.M. by Professor Arthur Keith. The lecture will be illustrated by specimens from the War Office collection.

THE Morison lectures will be delivered by Dr. Edwin Bramwell, F.R.C.P. Edin. & Lond., before the Royal College of Physicians of Edinburgh, on Monday and Friday, March 5th and 9th, at 5 o'clock P.M. each day. The subject chosen by Dr. Bramwell is Neurology of the War; the first lecture will deal with Gunshot Wounds of the Peripheral Nerves, and the second with Shell Shock and the Effects of Head Injuries.

#### THE BELGIAN DOCTORS' AND PHARMACISTS' RELIEF FUND.

A MEETING of the Executive Committee of this Fund was held on Feb. 22nd at THE LANCET Offices, when a printed statement was presented of the progress and working of the Fund during its first two years. The method of distribution of the statement was agreed upon by the Committee for, owing to the expense of paper, postage, and labour, it was not considered a fair demand on the resources of the Fund to send copies to all subscribers.

A communication was read from the London Branch of the International Relief Committee stating that it should be possible to continue to transmit the monthly grant of £800 to the Belgian medical organisation as now had been done for some time through Mr. Herbert Hoover, for in Mr. Hoover's absence the work of relief was still proceeding on the same lines.

The financial statement showed that the contributions since Dec. 15th, 1916, had amounted to £176, of which £147 had been received from the Royal College of Physicians of Edinburgh as a final contribution. £2400 had been sent to Belgium since the same date.

The Fund has received through Dr. William B. Coley and Dr. William K. Draper, acting as a committee of the New York Academy of Medicine, the sum of £13212s. 5d.

#### SUBSCRIPTIONS.

Doctors in the Belgian Congo (per M. Boulanger)—Dr. Marsez	200 fr.	Dr. Etienne	500 fr.	Dr. Hildeberg	500 fr.	Dr. Dubois	50 fr.	Dr. Daniel	100 fr.	Dr. De Lobeau	500 fr.	M. Perronni (pharmacien)	100 fr.	M. Boulanger (pharmacien)	100 fr.	=	80 0 0
Dr. G. D. H. Carpenter (eighteenth, nineteenth, twentieth, twenty-first, and twenty-second donations—total, 222)	147	2 11	21	0 2	2	0 0	5	0 0	5	0 0	21	0 2	2	0 0	0	2 6	132 12 5
Royal College of Physicians of Edinburgh (per Dr. Norman Walker)	147	2 11	21	0 2	2	0 0	0	2 6	0	2 6	21	0 2	2	0 0	0	2 6	132 12 5
Doctors of Invercargill, N.Z. (per Dr. Colquhoun)	21	0 2	2	0 0	0	0 0	0	0 0	0	0 0	21	0 2	2	0 0	0	0 0	21 0 2
Mr. William Cook (per the Chemist and Druggist)	0	2 6	0	2 6	0	2 6	0	2 6	0	2 6	0	2 6	0	2 6	0	2 6	0 2 6
New York Academy of Medicine, \$630 =	132	12 5	132	12 5	132	12 5	132	12 5	132	12 5	132	12 5	132	12 5	132	12 5	132 12 5

#### PHYSICAL TREATMENT FOR DISABLED SOLDIERS.

STATEMENT AND RECOMMENDATIONS BY THE COMMITTEE OF COUNCIL OF THE SECTION OF BALNEOLOGY AND CLIMATOLOGY OF THE ROYAL SOCIETY OF MEDICINE.

1. The serious and urgent problem of the physical treatment and training of disabled and discharged soldiers has been a long time under discussion, and it may be hoped is now approaching a solution. The committee, having devoted more than two years to an investigation of the subject in England and France, feel bound to reassert their profound conviction, already twice urged in reports to the War Office (August 28th, 1915, and Feb. 18th, 1916), that physical treatment, so often advocated by them, is now the thing most needed to prevent the formation of an army of cripples in this country. What has been already done here and there only points the way to the much larger aim of the committee, and that is to provide an adequate and well-ordered system of physical treatment for every disabled soldier throughout the country who needs it, as far as possible before his discharge. Such physical treatment consists of hydrotherapy, electrotherapy (including radiotherapy), mechanical treatment, medical gymnastics, and massage.

2. At the British spas large numbers of wounded have received treatment by waters and baths, although considerable difficulty and delay in obtaining this treatment is sometimes experienced. The number of invalids requiring such treatment is likely to increase, and the committee are of the opinion that the hospital accommodation for soldiers at the spas should be reserved for cases requiring hydrological treatment.

3. The committee are further of opinion that as the importance of systematic methods and records is becoming more and more apparent, the general adoption of one simple system of recording cases is most desirable, in order that the records supplied from all centres of physical treatment, whether at spas or attached to hospitals, may admit of exact classification.

4. A clinic for the physical treatment of disabled officers was opened at 126, Great Portland-street, London, W.. in July, 1916, as a result of the efforts of certain members of this committee. The intention of the promoters of this clinic was to provide an institution, thoroughly well equipped, which would afford to officers who were patients in the various hospitals in London the combination of the different forms of physical treatment which seemed necessary. Those responsible for it have endeavoured with some success not only to combine the best methods of treatment but to secure the accurate keeping of measurements and records. It is not a copy of any existing institution, and embodies some new features, such as the "whirlpool" and "sedative pool" baths. The clinic is now financed by the British Red Cross Society, and is called "The Red Cross Clinic for Physical Treatment of Disabled Officers." Officers of all the Allied nations are treated free of charge under careful and constant medical supervision. It is a matter of satisfaction to the committee that so much excellent work in physical treatment is now being done at certain of the command depôts, convalescent camps, military hospitals, and Red Cross hospitals. The experience already obtained clearly indicates the possibilities of such treatment when properly applied.

5. The vocational re-education of disabled soldiers in the British Islands, so far as it exists at present, has been in many instances carried out without medical supervision, and not associated with any concurrent physical treatment nor with any systematic measurement of the patient's disability and progress. The committee cannot regard this as satisfactory. On the other hand, they know that excellent re-educational work under medical supervision has been already accomplished at the Military Orthopaedic Hospital at Shepherd's Bush and at certain of the command depôts.

The senior honorary secretary reports as the result of a visit just paid to certain centres for physical treatment and training in France, under both the French and Belgian Governments, that the arrangements for industrial, intellectual, and agricultural re-education are being continually extended in that country, and are in every case under medical direction. Essential importance is attached by French experts to the combination of re-education with physical treatment. The committee notice with much

interest that these facts have been set forth very clearly by Sir Henry Norman in his recent report to the War Office on the Treatment and Training of Disabled and Discharged Soldiers in France.

They would only add that, in their opinion also, physical treatment should in the great majority of cases be provided as an integral part of re-education; and that the determination of a man's capacity for work ought not to depend on casual observations, but on the results of the periodical measurement of his progress by means of accurate instruments. The very important economic and financial aspect of this matter are outside the province of the committee.

#### *Recommendations.*

1. That a service of physical treatment consisting of hydrotherapy, electrotherapy (including radiotherapy), mechanical treatment, medical gymnastics, and massage, should be made available at the earliest possible date for all soldiers needing it who are disabled by war.

2. That centres of physical treatment, comprising all the above methods, should be established throughout the

country on an adequate scale, and wherever possible in association with general hospitals, so that other forms of special treatment and diagnosis may be readily available.

3. That at such centres there should be a uniform system of measurements and records.

4. That centres of re-education and centres of physical treatment should be closely associated.

5. That all centres of physical treatment should be under medical direction, with periodical inspection, and that medical men who are experts in the various departments of physical treatment should be appointed to the staff.

6. That at the centres first established instruction in methods of physical treatment should be provided for the use of medical practitioners, medical students, and assistants.

(Signed) WILLIAM GORDON,  
President of the Section;  
SEPTIMUS SUNDERLAND,  
Chairman of the Committee;  
R. FORTESCUE FOX,  
J. CAMPBELL MCCLURE,  
Hon. Secretaries of the Committee.

Feb. 24th, 1917.

## URBAN VITAL STATISTICS.

### VITAL STATISTICS OF LONDON DURING JANUARY, 1917.

In the accompanying table will be found summarised complete statistics relating to sickness and mortality in the City of London and in each of the metropolitan boroughs. With regard to the notified cases of infectious diseases, it appears that the number of persons reported to be suffering from one or other of the ten diseases specified in the table was equal to an annual rate of 4·0 per 1000 of the population, estimated at 4,310,000 persons in the middle of the year; in the three preceding months the rates were 5·4, 5·0, and 3·9 per 1000 respectively. The lowest rates in January were recorded in Kensington, Hammersmith, Hampstead, Holborn, the City of London, and Wandsworth; and the highest rates in Paddington, Bethnal Green, Stepney, Poplar, Southwark, Bermondsey, and Greenwich. The prevalence of scarlet fever showed no variation from that recorded in the preceding month; this disease was proportionally most prevalent in Fulham, Chelsea, St. Marylebone, Bethnal Green, Stepney, Bermondsey, Lewisham, and Woolwich. The Metropolitan Asylum Hospitals contained 800 scarlet fever patients at the end of the month, against 1117 in 1916, and 913 at the end of the three preceding months; the weekly admissions averaged 95, against 160, 131, and 95 in the three preceding months. Diphtheria was rather more prevalent than in the preceding month; the greatest proportional prevalence of this disease was recorded in Paddington, Stepney, Poplar, Southwark, Bermondsey,

and Greenwich. The number of diphtheria patients under treatment in the Metropolitan Asylums Hospitals, which had been 1543 and 1420 at the end of the two preceding months, had further declined to 1202 at the end of January; the weekly admissions averaged 68, against 209, 187, and 143 in the three preceding months. Enteric fever also showed a slightly increased prevalence; of the 36 cases notified during the month, 7 belonged to Stepney, 5 to Wandsworth, 4 to Hackney, 2 to Kensington, 2 to the City of Westminster, 2 to Battersea, 2 to Camberwell, and 2 to Deptford. There were 36 enteric fever patients under treatment in the Metropolitan Asylums Hospitals at the end of the month, against 39, 42, and 37 at the end of the three preceding months; the weekly admissions averaged 6, against 7, 7, and 5 in the three preceding months. Scarlet fever was proportionally most prevalent in Bethnal Green, Poplar, Southwark, Bermondsey, and Deptford. The 21 cases of puerperal fever notified during the month included 3 in Bethnal Green, 3 in Stepney, 2 in Fulham, 2 in Poplar, 2 in Lewisham, and 2 in Woolwich. The 70 cases of cerebro-spinal meningitis included 7 in St. Pancras, 6 in Islington, 5 in the City of Westminster, 5 in Lambeth, and 4 each in Paddington, Fulham, Hackney, southwark, Wandsworth, and Woolwich; and of the 10 cases of poliomyelitis 2 belonged to Islington and 2 to Lambeth.

The mortality statistics in the table relate to the deaths of persons actually belonging to the several metropolitan boroughs, the deaths occurring in institutions having been distributed among the several boroughs in which the deceased persons had previously resided. During the five weeks ended Feb. 3rd the deaths of 7591 London residents were registered, equal to an annual rate of 18·4 per

### ANALYSIS OF SICKNESS AND MORTALITY STATISTICS IN LONDON DURING JANUARY, 1917.

(Specially compiled for THE LANCET.)

CITIES AND BOROUGHS.	Estimated civil population, 1915.	Notified Cases of Infectious Disease.										Deaths from Principal Infectious Diseases.												
		Small-pox.	Scarlet fever.	Diphtheria.*	Typhus fever.	Enteric fever.	Other con-	Puerperal	Cerebro-spinal	Pollomyelitis.	Total.	Annual rate per 1000 persons living.	Small-pox.	Measles.	Scarlet fever.	Diphtheria.*	Whooping-	Enteric fever.	Diarrhoea and	Total.	Annual rate per 1000 persons living.	Deaths from all causes.	Deaths per 1000 living.	
LONDON....	4,310,000	—	517	777	1	36	4	21	203	70	10	1639	4·0	—	151	6	57	19	9	83	335	0·8	7591	18·4
<i>West Districts:</i>																								
Paddington....	131,397	—	13	32	—	—	—	1	10	4	—	60	4·8	—	—	2	1	1	1	4	8	0·6	276	22·1
Kensington....	155,795	—	19	12	—	2	—	—	4	2	—	39	2·6	—	—	1	—	—	1	5	6	0·4	287	19·2
Hammersmith....	118,559	—	10	17	—	1	—	—	2	2	1	33	2·9	—	—	1	—	1	1	3	3	0·3	206	18·1
Fulham....	151,161	—	23	33	—	—	—	2	5	4	—	67	4·6	—	—	2	—	4	5	4	5	0·3	244	16·8
Chelsea....	58,421	—	13	6	—	—	—	—	1	—	—	20	3·6	—	—	2	—	2	2	4	4	0·7	120	21·4
City of Westminster....	135,104	—	11	14	—	2	—	—	—	7	5	—	39	3·0	—	3	—	2	1	1	7	0·5	249	19·2
<i>North Districts:</i>																								
St. Marylebone....	100,260	—	16	10	—	1	—	1	5	1	1	35	3·6	—	4	—	1	—	1	—	6	0·6	189	19·7
Hampstead....	81,769	—	6	13	—	1	—	—	3	—	—	23	2·9	—	—	—	—	2	2	6	0·3	118	15·1	
St. Pancras....	209,322	—	22	30	—	1	—	—	6	7	1	67	3·5	—	13	—	3	—	4	6	1·1	391	20·4	
Islington....	316,242	—	42	53	—	1	—	16	6	2	2	120	4·0	—	3	1	2	4	1	15	0·5	571	18·8	
Stoke Newington....	50,527	—	3	8	—	1	—	1	1	1	—	15	3·1	—	—	2	2	4	2	2	2	0·4	82	18·9
Hackney....	217,833	—	22	35	—	4	—	—	8	4	1	73	3·5	—	—	2	1	2	6	11	0·6	346	16·6	
<i>Central Districts:</i>																								
Holborn....	40,405	—	3	7	—	—	—	—	2	2	—	7	1·8	—	3	—	1	—	—	1	3	0·8	97	25·0
Finsbury....	76,915	—	7	14	—	—	—	—	5	—	—	27	3·7	—	—	1	2	—	1	4	0·5	170	23·1	
City of London....	19,461	—	1	4	—	—	—	—	—	—	—	5	2·7	—	—	1	—	1	—	1	0·5	27	14·5	
<i>East Districts:</i>																								
Shoreditch....	103,627	—	13	15	—	1	3	—	5	—	—	37	3·7	—	1	—	2	—	7	10	1·0	185	18·6	
Bethnal Green....	120,207	—	17	20	—	1	—	3	13	—	—	56	4·9	—	8	—	5	—	14	1·2	206	17·9		
Stepney....	265,731	—	44	72	1	7	—	3	14	3	—	144	5·7	—	10	2	8	—	5	25	1·0	458	18·0	
Poplar....	156,247	—	15	40	—	1	—	2	14	—	1	73	4·9	—	3	—	3	—	2	9	0·6	243	16·2	
<i>South Districts:</i>																								
Southwark....	179,424	—	12	64	—	—	—	1	16	4	1	98	5·7	—	19	—	2	—	8	29	1·7	375	21·8	
Bermondsey....	117,188	—	23	31	—	1	—	1	10	1	1	68	6·1	—	22	—	—	—	—	24	2·1	227	20·2	
Lambeth....	284,188	—	31	64	—	1	1	—	12	5	2	116	4·3	—	15	—	6	3	—	32	1·2	531	19·5	
Battersea....	161,945	—	21	21	—	—	—	—	2	2	—	48	3·1	—	4	—	1	1	3	10	0·6	285	18·4	
Wandsworth....	312,249	—	27	30	—	2	5	—	7	4	—	73	2·4	—	13	1	4	—	2	20	0·7	436	14·6	
Camberwell....	254,385	—	29	44	—	2	—	—	11	3	—	89	3·6	—	13	4	1	1	10	22	1·2	463	19·0	
Deptford....	110,299	—	11	25	—	1	—	—	9	1	—	48	4·5	—	1	—	3	—	3	7	0·7	198	18·7	
Greenwich....	96,385	—	11	28	—	—	—	—	5	—	—	44	4·8	—	5	—	3	1	—	1	10	1·1	171	18·5
Lewisham....	164,438	—	32	23	—	—	—	2	3	3	—	63	4·0	—	1	—	2	—	1	—	4	0·3	244	15·5
Woolwich....	129,506	—	20	19	—	—	—	—	2	7	4	—	52	4·2	—	8	—	1	1	3	13	1·0	194	15·6
Port of London....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

\* Including membranous croup.

1000; in the three preceding months the rates had been 12·0, 14·5, and 22·8 per 1000. The death-rates during the month ranged from 14·5 in the City of London, 14·6 in Wandsworth, 15·1 in Hampstead, 15·5 in Lewisham, and 15·6 in Woolwich, to 21·4 in Chelsea, 21·8 in Southwark, 22·1 in Paddington, 23·1 in Finsbury, and 25·0 in Holborn. The 7591 deaths from all causes included 335 which were referred to the principal infectious diseases; of these, 151 resulted from measles, 6 from scarlet fever, 57 from diphtheria, 19 from whooping-cough, 9 from enteric fever, and 93 from diarrhoea and enteritis among children under two years of age. The lowest death-rates from these diseases in the aggregate were recorded in Hammersmith, Kensington, Fulham, Hampstead, Stoke Newington, and Lewisham; and the highest rates in St. Pancras, Bethnal Green, Southwark, Bermondsey, Lambeth, Camberwell, and Greenwich. The 151 deaths from measles were 15 in excess of the corrected average number in the corresponding period of the five preceding years; this disease was proportionally most fatal in St. Pancras, Holborn, Bethnal Green, Southwark, Bermondsey, Lambeth, and Woolwich. The 6 deaths from scarlet fever were 16 fewer than the corrected average number, and included 2 in Stepney and 1 each in Kensington, Islington, Bethnal Green, and Wandsworth. The 57 deaths from diphtheria were 9 below the corrected average; of these 8 belonged to Stepney, 6 to Lambeth, 4 to Wandsworth, 4 to Camberwell, 3 to St. Pancras, 3 to Poplar, 3 to Deptford, and 3 to Greenwich. The 19 fatal cases of whooping-cough were 70 below the corrected average, and included 4 in Islington, 3 in Lambeth, 2 in Finsbury, and 2 in Shoreditch. The 9 deaths from enteric fever were 7 below the corrected average, and included 2 in Hackney and 1 each in Paddington, Hammar-smith, St. Marylebone, Islington, Battersea, Camberwell, and Lewisham. The 93 deaths from diarrhoea and enteritis among children under 2 years of age were only 4 below the average; the greatest proportional mortality from this cause was recorded in Paddington, Kensington, Chelsea, Shoreditch, Bethnal Green, Southwark, Lambeth, Camberwell, and Deptford. In conclusion, it may be stated that the aggregate mortality in London during the month from these principal infectious diseases was 21·4 per cent. below the average.

(Week ended Feb. 24th, 1917.)

**English and Welsh Towns.**—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18,000,000 persons, the annual rate of mortality was equal to 21·0, against rates steadily increasing from 16·2 to 22·5 per 1000 in the five preceding weeks. In London, with a population exceeding 4,000,000 persons, the death-rate was 21·8, or 1·4 per 1000 less than that recorded in the previous week; in the remaining towns the rates ranged from 11·9 in Walthamstow, 12·2 in Edmonton, and 13·0 in Stockport, to 29·5 in Brighton, 30·3 in Bournemouth, and 34·7 in Gloucester. The principal epidemic diseases caused 336 deaths, which corresponded to an annual rate of 1·0 per 1000, and included 161 from measles, 65 from infantile diarrhoea, 52 from diphtheria, 50 from whooping-cough, and 4 each from scarlet fever and enteric fever. The deaths from measles showed a further increase on the numbers in the four preceding weeks, and caused the highest annual rates of 1·8 in Wimbledon and in Southampton, 2·1 in Dudley, 2·2 in East Ham, 2·6 in Ilford, and 4·2 in Wigan. The 813 cases of scarlet fever and the 148 cases of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 7 and 11 in excess of the numbers at the end of the previous week. Of the 6974 deaths from all causes in the 96 towns, 245 resulted from violence. The causes of 83 of the total deaths were uncertified, of which 16 were registered in Birmingham, 11 in Liverpool, and 5 in Manchester, but only 1 in London.

**Scotch Towns.**—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death rate was equal to 19·6, against 17·9 and 20·1 per 1000 in the two preceding weeks. The 425 deaths in Glasgow corresponded to an annual rate of 19·9, against 21·8 per 1000 in London, and included 18 from whooping-cough, 16 from measles, 7 from diphtheria, 5 from infantile diarrhoea, and 1 each from enteric fever and scarlet fever. The 137 deaths in Edinburgh were equal to a rate of 21·5 per 1000, and included 3 from measles, 2 from whooping-cough, and 1 each from scarlet fever and diphtheria.

**Irish Towns.**—The 205 deaths registered in Dublin were equal to an annual rate of 26·8, or 0·4 per 1000 below that recorded in the previous week, and included 8 from infantile diarrhoea, 6 from measles, and 1 from whooping-cough. The 235 deaths in Belfast were equal to a death-rate of 31·2, and included 7 each from measles and infantile diarrhoea, 2 each from whooping-cough and diphtheria, and 1 from enteric fever.

**THE LATE DR. JOSEPH LAWSON.**—The death occurred at Hove on Feb. 18th of Dr. Joseph Lawson, who in the early days of his career was an assistant physician at Dr. Steevens' Hospital, Dublin. He was educated at Trinity College, taking the degrees of B.A., M.B. in 1868 and the L.R.C.S.I. in 1867. For many years he resided in Yorkshire, where he was medical officer of health at Hebden Bridge. Dr. Lawson, who was 70 years of age, had been living in retirement at Hove.

**BRIGHTON AND THE INDIAN WARRIORS.**—Official announcement was made at the meeting of the Brighton corporation on Feb. 22nd that the Indian Council had sanctioned an expenditure of £750 on the proposed monument to be erected on the South Downs at Patcham, where the bodies of Sikh and Hindu soldiers who died in the Indian hospitals at Brighton were buried, and towards the cost of maintaining it in perpetuity. The corporation had already voted a like sum (£750), and Mr. Austen Chamberlain, in his letter to Sir John Otter, ex-mayor, who took the initiative in the scheme, says that his council will not object to increasing its contribution to £1000 if the decisions taken as to design and material involve an outlay exceeding the £1500 already agreed upon.

## THE SERVICES.

### R.A.M.C. NEW HEADQUARTERS.

The headquarters of the Army Medical Service will in future be at Adastral House, Victoria Embankment.

### ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonels to be acting Colonels whilst employed as Assistant Directors of Medical Services of Divisions: R. W. Clements, D.S.O., H. Herrick, T. H. J. C. Goodwin, C.M.G., D.S.O.

Lieut.-Col. H. H. Brown is retained on the active list, under the provisions of Articles 120 and 522 Royal Warrant for Pay and Promotion, and to be Supernumerary.

Temp. Col. F. D. Bird, C.B., reverts to temporary Lieutenant-Colonel on re-posting.

Granted temporary rank whilst employed at the Craiglockhart War Hospital.—As Major: W. H. Bryce. As Captain: W. H. R. Rivers.

Temp. Major S. N. Davis, C.A.M.C., from General List, to be temporary Major.

Capt. H. C. D. Rankin to be acting Lieutenant-Colonel whilst commanding a Field Ambulance.

Temp. Capt. J. S. Gladwin, C.A.M.C., from a Canadian Infantry Battalion, to be temporary Captain.

Temp. Capt. William James Dobson Smyth to be Lieutenant, and is granted the rank of temporary Captain.

Temporary Lieutenants to be temporary Captains: J. Potter, E. R. Dermer, J. J. O'Kelly, H. Stewart, S. L. Haslett, G. Sutherland, F. G. Heard, D. L. Sewell, W. E. Waller, J. R. Griffith, N. Grace, P. G. Temple, G. T. L. Murphy, D. M. Baillie, C. B. F. Ivy, H. V. Forster, J. Bamforth, E. E. Semmence, G. Hart, D. Smith, J. S. Part, D. J. Clark, G. G. Buchanan, F. M. Davies, J. L. Cochran, R. C. Harkness, G. Jackson, E. W. N. Hobhouse, J. G. Slade, J. W. E. Cole, D. J. O'Brien, E. M. Balthasar, W. W. Halsted, G. E. Anderson, T. F. Moran, W. S. McGowan, J. P. Douglas, T. W. Rutledge, P. G. Leeman, F. H. McCaughey, C. H. Seville, G. F. C. Healy, W. G. Jones, I. Williamson, C. H. C. Byrne, R. W. G. Young, J. S. Crawford, C. E. Sharp, P. Hudson, H. M. Buchler-Hayes, J. M. O'Reilly, H. McW. Daniel, A. P. Hart, A. N. W. Colahan, H. Stobie, R. Nichol, J. E. Cable, B. H. Wood, W. A. Muir, D. S. Steele-Perkins, G. C. Robinson, J. Colgan, A. G. East, W. J. Macdonald, C. S. Read, G. Cranston.

To be temporary Captains: S. Ritson, R. A. Jones, Temp. Lieuts. A. J. Anderson and W. Roche.

To be temporary Lieutenants: E. Ashby, K. J. A. Davis, L. V. Gatt, J. L. H. Paterson, M. C. Irwin, W. G. Cobb, A. F. Campbell, H. N. Webber, D. Mitchell, H. H. R. Bayley, G. W. Anrum, J. Cameron, J. C. Pearce, M. J. Ryan, P. O. W. Browne, G. P. Jones, R. Maclean, D. S. E. Milligan, H. W. Catto, J. Freeman, J. Aylen, R. C. L. Batchelor, G. H. Joseph, C. J. G. Bourhill, D. Anderson, G. F. B. Simpson, J. E. Hatchie, D. C. Ogilvie, W. F. Box, A. R. H. Harrison, A. R. J. Douglas, M. S. Fraser, H. Cardin, temp. Hon. Lieut. N. S. Sherrard, M. Munro, Temp. Hon. Lieut. H. Archer, E. W. H. Cruickshank, W. P. Wippell, R. G. Stirling, J. R. Dick, T. T. M. Dillingham, W. A. Clement.

Temporary honorary Lieutenants of the St. John Ambulance Brigade Hospital to be temporary honorary Captains: S. A. Henry, C. E. S. Jackson, W. Wilson.

Temp. Capt. J. G. Wilson, C.A.M.C., resigns his temporary commission at his own request.

Temporary Captains relinquishing their commissions: A. M. Ross, E. S. Moorhead, C. Banting, C. Gordon, W. A. Brown, J. E. Stacey (on account of ill-health caused by wounds, and is granted the honorary rank of Captain), H. J. Watt (on account of ill-health).

Temp. Hon. Capt. A. G. Wilkins and Temp. Hon. Lieut. P. L. Hope, having ceased to be employed with No. 5 British Red Cross (Anglo-American) Hospital, relinquish their commissions.

Temporary Lieutenants relinquishing their commissions: G. B. S. Soper, F. L. Spalding, H. Bond, C. G. Merrick, W. G. G. Coulter, J. P. Brown, J. S. Leslie, G. S. Robinson, W. E. Taylor, W. Dixon, T. M. R. Waddell, J. McIlraith.

### SPECIAL RESERVE OF OFFICERS.

Lieutenants to be Captains: G. Chesney, A. R. Steven, W. A. Malone, J. Ross, J. C. Preston, A. Johnstone, G. S. Mather, A. F. Cook, A. C. Dickey, W. Griffiths, E. G. Flishe.

To be Lieutenants: G. A. Harrison, A. R. Dingley (from University of London Contingent, O.T.C.), A. T. Woolward, B. Parker (from Dublin University Contingent, O.T.C.), P. A. Buxton, D. C. Bluet.

### TERRITORIAL FORCE.

Lieut.-Col. W. Patterson, Territorial Force Reserve, to be Major (temporary).

To be Acting Lieutenant-Colonels whilst commanding a Field Ambulance: Capts. (temp. Majors) E. A. Houchin, T. B. Levton, A. A. Hingston, P. Mokey, F. G. Dobson, and Capt. A. J. Williamson.

Capt. P. T. Rutherford, from Attached to Units other than Medical Units, to be Captain.

Lieutenants to be Captains: D. Cameron, J. Chalmers, E. McM. Dunlop, A. C. Hepburn, D. Campbell.

Capt. A. W. Falconer is seconded whilst holding a temporary commission in the R.A.M.C.

C. W. Yates to be Lieutenant.

Major (temp. Lieut.-Col.) A. E. Jerman relinquishes his temporary rank on ceasing to command a Field Ambulance.

Lieut. J. M. Orr resigns his commission.

**A MEDICAL HIGH SHERIFF OF DUBLIN.**—At a meeting of the Corporation of the city of Dublin last week, the High Sheriff of the city for 1917, Mr. Myles Keogh, L.R.C.S. Ire., was invested with the chain of office. It is many years since this dignity was held by a member of the medical profession. Mr. Keogh practises as a dentist.

## Correspondence.

"Audi alteram partem."

### THE MICTURITION CENTRE.

*To the Editor of THE LANCET.*

SIR,—In your issue of Feb. 3rd Mr. J. W. Thomson Walker, in an interesting account of the state of the bladder in man after injury to the spinal cord, makes some historical remarks on the micturition centre, which, I think, call for comment. He says—

The work of Gaskell shows that the centre for micturition lies outside the spinal cord, in the hypogastric and mesenteric plexuses of the sympathetic. Müller, applying Gaskell's view, states that after complete separation of the bladder from the cord reflex micturition still takes place.

Gaskell, I am sure, would have energetically rejected the statement that there was no micturition centre in the spinal cord. So far as I know no one who has experimented on the matter in the last 30 years has questioned its existence, although different values have been attributed to it. The existence of an additional centre outside the spinal cord has long been the subject of controversy. Sokownin<sup>1</sup> in 1874 found that stimulation of the central end of one hypogastric nerve, after severance of all connexion with the spinal cord, caused reflex contraction of the bladder, and considered it to be a reflex like that from the spinal cord involving afferent nerve cells. The experiment was taken as supporting the current theory that peripheral ganglia connected with organs acted as reflex centres for them. It was shown by Anderson and myself<sup>2</sup> in 1894, and by myself<sup>3</sup> in 1900, that the reflex did not involve afferent nerve fibres or cells, but was due to the branching of efferent fibres, one branch running to a nerve cell supplying one side of the bladder and the other to a nerve cell supplying the other side. This I spoke of as an axon-reflex. Goltz and Ewald<sup>4</sup> in 1896 found that micturition returned in dogs after removal of the whole spinal cord below the upper thoracic region. Müller<sup>5</sup> in 1901 made experiments similar to those of Goltz and Ewald, but with less extensive removal of the spinal cord, and confirmed their results. Gaskell,<sup>6</sup> in his book posthumously published in 1916, does not (so far as I have seen) make any mention of a micturition centre; he had not at any time made experiments with regard to it. He discusses the origin of peripheral reflexes in the bladder and elsewhere, and adopts the theory that, so far as they occur, they are due to axon-reflexes.

I am, Sir, yours faithfully,

Cambridge, Feb. 21st, 1917.

J. N. LANGLEY.

### ACUTE GASTRIC ULCER.

*To the Editor of THE LANCET.*

SIR,—Between Jan. 5th and Feb. 3rd of this year six cases of acute gastric ulcer (with pronounced haematemesis or melena, or both haematemesis and melena) were admitted to the Connaught Hospital, Aldershot. Only two cases of a similar nature have been admitted during the previous 22 months. Six cases will, of course, prove nothing, and their occurrence at short intervals may well be within the limits of ordinary coincidence; but the contrast between this comparatively large number and previous admissions of the same disease encourages me to speculate whether something more than coincidence might be invoked and to mention publicly the series for what it is worth as an isolated observation, in the hope that others may have noted the same "coincidence" at this or any other time. As a determining factor, mentioned merely on account of its obviousness, I suggest the protracted low temperature experienced over the whole of this period. I need not waste your valuable space with clinical details except to mention that the ages of the men were 29, 32, 34, 37, 38, and 40 respectively; their

<sup>1</sup> Fourth Vers. russischer Naturforscher in Kasan (Summary in Arch. f. d. ges. Physiol., x., 374).

<sup>2</sup> Journ. of Physiol., xvi., 410.

<sup>3</sup> Ibid., xxv., 364.

<sup>4</sup> Arch. f. d. ges. Physiol., lxiii., 362.

<sup>5</sup> Deutsc. Zeitschr. f. Nervenheilk., xxi., 86.

<sup>6</sup> The Involuntary Nervous System (Longmans, Green, and Co.).

length of service varied from 10 days to 20 months; one case may have been of traumatic origin, none of the cases gave a history of previous haematemesis.

Finally, of the two previous cases referred to above, one was aged 35, the other 51. The elder, after repeated haematemesis, died, having existed upon salines for five weeks, during which time operation, which was urgently advised, was persistently refused.

I am, Sir, yours faithfully,

ADOLPHE ABRAHAMS,

Temporary Captain, R.A.M.C.; Officer in Charge Medical Division, Connaught Hospital, Aldershot.

### THE REPORT ON CEREBRO-SPINAL FEVER.

*To the Editor of THE LANCET.*

SIR,—New results of value to bacteriology, gleaned from recent research on identification of meningococci, are recorded in the Third Special Report<sup>1</sup> of the Medical Research Committee, and the general value of this document is enhanced by inclusion of other matters both of clinical and controversial interest. That at the onset of cerebro-spinal fever the same type of organism is always present in the naso-pharynx as is to be found in the spinal fluid is a fact of great value in early diagnosis, and Captain Flack<sup>2</sup> has shown that by plating a naso-pharyngeal swab on the spot it is possible to diagnose atypical cases within 48 hours.

Of less value seems the pronouncement<sup>3</sup> that naso-pharyngeal organisms, giving cultural and fermentative signs of meningococci, are to be rejected as *pseudo-meningococci* unless they conform to the serological reactions of one or other of four types of meningococci, isolated from 32 cases in 1915. Admitted that these types have predominated in epidemics during 1915–16, they do not exhaust the possible number of pathogenic strains. Flexner has isolated at least 32 strains. Two strains isolated by me<sup>4</sup> from spinal fluid were not agglutinated by antisera from Gordon's Types 1, 2, or 3, but were agglutinated by Flexner in high dilutions, and it is surely an accepted principle of medicine that any germ may become pathogenic if tissue resistance be sufficiently lowered. If so, inagglutinable strains should be regarded as potentially pathogenic. My objection to this limitation is its possible influence on treatment. Without access to a laboratory, where the organism might be differentiated into its serological type and if atypical a serum prepared—a matter of time and distance to country practitioners—it is certainly prejudicial to the patient to surmise that the organism must conform to one of four types, or to employ a serum evolved from one of them. The indication is rather to use a multivalent serum, such as Flexner's. Fleet-Surgeon Bassett-Smith<sup>5</sup> found that of 28 naso-pharyngeal strains 27 were agglutinated by Flexner. Of these, 21 were also tested with Gordon's serums 1 and 2. Seven agglutinated to 1 and 13 to 2.

Lastly, this report contains such authoritative confirmation of the theory of cerebro-spinal fever<sup>6</sup> advanced by me in 1915, that I cannot but regret an absence of any endorsement of those preventive measures which should follow the correct etiology. Lieutenant-Colonel M. H. Gordon and Captain Flack<sup>7</sup> accept spread of infection as due to floating droplets of infected naso-pharyngeal secretion from the "carrier," and as influenced by "the degree of bad ventilation or overcrowding obtaining in his immediate environment." Again, Captain Flack<sup>8</sup> confirms my earlier observation, embodied in a report to the War Office on Sept. 27th, 1915, that swabs and plates conveyed some distance on a cold day to a laboratory are liable to be negative. The point is that meningococci die in 30 minutes at a temperature of 62° F.

I have contended that under conditions of fresh air it is impossible for meningococci to pass from throat to throat, and Captain Flack records a new observation on this point—"whatever the form of treatment, a spell of sunshine and dry weather markedly influenced the rate of discharge of carriers."<sup>9</sup> This suggests that fresh air not only prevents

<sup>1</sup> National Health Insurance. Special Report Series. No. 3. Bacteriological Studies in the Pathology and Preventive Control of Cerebro-spinal Fever among the Forces during 1915 and 1916.

<sup>2</sup> Loc. cit., p. 19.

<sup>3</sup> Ibid., p. 14.

<sup>4</sup> THE LANCET, 1915, II., 882.

<sup>5</sup> Loc. cit., p. 68.

<sup>6</sup> Loc. cit., p. 77.

<sup>7</sup> THE LANCET, 1916, II., 888.

<sup>8</sup> Ibid., p. 62.

<sup>9</sup> Ibid., p. 63.

spread of infection, but also tends to destroy organisms in the throat. Nevertheless, in the report there is no plea for better ventilation of tents, huts, and barracks, although much labour has been expended on construction of steam engines for belching forth antiseptic vapours. To what end? That "carriers," once disinfected, shall return from the clouded atmosphere of the sterile shrine to those unhygienic conditions under which infection arose and was spread?

In all this there is nothing to occasion surprise. For seven centuries bad air was recognised in the etiology of tuberculosis, while fresh air was ignored in prevention. History will always repeat itself, and so to-day nothing short of a miracle will induce our profession to act on the true origin and prevention of cerebro-spinal fever. Yet in conclusion I would suggest that the tendency of special departments of medicine to attenuate wider physiological and clinical concepts into a microscopic field is to be regretted. I am, Sir, yours faithfully,

HALLIDAY SUTHERLAND,  
Harley-st., W., Jan. 20th, 1917. Temporary Surgeon, Royal Navy.

## THE USE OF QUININE INTERNALLY AS AN ANTISEPTIC.

To the Editor of THE LANCET.

SIR.—Eight years ago when called in by a midwife to a case of puerperal septicæmia, after curetting and douching the uterine cavity, I ordered daily douching with weak iodine lotion and internally quinine sulphate 2 gr. combined with acid. hydrobromic. dil. every four hours in water. As the temperature rapidly fell to normal and the discharge became sweet and small in amount I continued its use in such cases with gratifying success and commenced to put all cases of perityphilitic abscess, gall-bladder abscess, and empyema upon it immediately after operation. In cases of infective bone and joint disease, such as periostitis, osteomyelitis, and suppurative arthritis, I ordered quinine immediately upon admission and prior to operation, continuing it afterwards as in the previous cases. As a result I found that the discharge rapidly diminished in amount, becoming thin, inoffensive, and less purulent, the temperature usually becoming normal in a few days, when the quinine can be discontinued. When the quinine was discontinued before the temperature had been normal for several days the discharge was apt to increase in quantity, becoming more purulent and offensive, with a rising temperature. In discharging bone and joint cases in which quinine was administered before operation, the temperature fell to a lower level and the discharge diminished more rapidly than in other cases. During the eight years my annual operative mortality has not exceeded 2 per cent., rarely more than 1 per cent., in general surgical hospital work.

Acting on this experience I have employed quinine in all cases of septic infection since July, 1915, at the Hotel Dieu, Waterloo and District Hospital, the annexe of the Seaford Military Hospital, where I have had control of 50 beds. A large number of cases of infected gunshot wounds, many of which contained necroëd bone, have been treated there under my care. The mortality rate of my surgical operative military cases has been nil during that period on a total of more than 130 cases.

Dr. J. Mitchell Bruce in his "Materia Medica and Therapeutics," 1915 edition, makes the following, among other, statements regarding the action of quinine: (1) Externally quinine is a local antiseptic, and disinfectant to wounds and ulcers; (2) it may be found in the blood within a few minutes of its administration; (3) it diminishes the number of leucocytes in the circulation very greatly; (4) it augments and later paralyses the amoeboid movements of leucocytes; (5) injected into animals in large dose it prevents the occurrence of suppuration. The action appears to me as follows: Quinine internally administered rapidly renders the blood-stream antiseptic, thus retarding the rate of increase, growth, and development of micro-organisms in all parts of the body. The body cells which are manufacturing anti-toxin in response to the toxic stimulation are thus enabled to get the upper hand, and are probably aided by the phagocytes.

I am indebted to Professor E. E. Glynn, of Liverpool University, for two references, the only ones which I can find, on the value of quinine proved experimentally.

(1) Wilson,<sup>1</sup> who concludes that "The administration of 15 grains of quinine to healthy students seemed to cause a slight increase in their opsonic index," and that "quinine sulphate *in vitro* has an inhibitory effect on phagocytosis in strong solutions, but apparently a stimulating influence in dilutions from 1/15,000 to 1/1,000,000"; and (2) Th. Grün-pan,<sup>2</sup> "Ueber den Einfluss von Chininlösungen auf die Phagocytose," who states that a 0·002 per cent. quinine solution led to a relative increase in phagocytosis of a carmine solution in a rat, but a 0·1 per cent. of quinine solution was injurious to phagocytosis.—I am, Sir, yours faithfully,

VINCENT J. GLOVER, M.D. Liverp..

M.B., Ch.B. Vict.,

Medical Officer of Health, Waterloo and Seaford; Honorary Surgeon, Waterloo and District Hospital.  
Feb. 15th, 1917.

## LIQUOR RESTRICTION AND CASUALTIES.

To the Editor of THE LANCET.

SIR.—It is interesting to note how drunkenness amongst working classes affects the hospital casualty rooms. This is the main casualty hospital in the borough of Bootle and round about, draining from a large "labour" population. The casualty room is open day and night, and I, having the unfortunate honour of being in charge, especially on Saturdays, have noticed how often I had to attend to these "merry-making accidents." Before the present regulations I would not dream of retiring to bed before 1 or 2 A.M., as the casualty room was very frequently visited by customers of public-houses or those who suffered through them. Lately, gratifying to see, it is seldom that we come across a person in such a state. The usual question of a constable, "Is it delirium tremens, doctor?" to detain him over the week-end, is almost forgotten.

Without exaggeration I can safely say that these casualties are reduced to 40 per cent., if not less, whereas other "unavoidable" cases remain the same. I have not had a case of intoxication as a cause of other injuries in the wards for a long time. Further, this hospital, being situated in the midst of a thickly populated area, we used to be troubled at night with "music, mirth, and revelry" outside, but audible in every ward; this no longer exists. I am writing to know, as expected, if other house surgeons thus placed have noticed the same incidence, for surely it could not be the Bootle people only who have so suddenly and marvellously changed into temperance.

I am, Sir, yours faithfully,

D. RAM THAPAR, M.B., Ch.B. Edin.  
Borough Hospital, Bootle, Feb. 26th, 1917.

## THE FIRST SCHOOL FOR MOTHERS.

To the Editor of THE LANCET.

SIR.—If only for the sake of historical accuracy, may I be permitted to point out that your correspondent, Dr. J. E. Sandilands, in his letter in your issue of Feb. 17th, is as incorrect in his facts as to which was the first school for mothers in England as was the writer of the article whose statements he criticises. As a matter of fact, Winchester has no better claim to have started the first school for mothers than St. Pancras. Although opinions may differ as to the exact definition of a school for mothers, there can be no doubt that the special kind of infant welfare work started in Winchester in November, 1906, had been in progress in at least a dozen other towns for some considerable number of years before that date. If Dr. Sandilands would care for details, I can give them to him, but I think he will find sufficient evidence on this point in a paper I read at the National Conference on Infant Mortality held in Liverpool, 1914, and published in the report. No society or institution can claim to be a school for mothers without an infant consultation, for this is the pivot round which all its teaching activities revolve. The first welfare centre to have an infant consultation was that of St. Marylebone. Its schools of mothercraft were started in February, 1906, under the name of the Borough of St. Marylebone Health Society, and its Infant Consultation opened its doors on May 10th, 1906.

The opening of the St. Pancras School for Mothers was inaugurated on July 1st, 1907, at the St. Pancras Town

<sup>1</sup> Amer. Journ. Physiol., 1907, xix., 450.

<sup>2</sup> Centralbl. f. Bakter. und Parasit. Infekt., 1908, Bd. xlvi., 445.

Hall. I have in my possession the printed bill inviting the attendance of the public, so that there can be no doubt as to the date; but, as a matter of fact, St. Pancras was not, I believe, even the second in the list of schools for mothers. Although the St. Pancras school is in no way entitled to the claim of being the pioneer school, there is no question that in propaganda work this London borough deserves the greatest credit. But Winchester has no claim either to have been the first school for mothers or a pioneer in instructing mothers.

I am, Sir, yours faithfully,  
ERIC PRITCHARD.

London, W., Feb. 25th, 1917.

## THE DIFFERENTIATION OF HEART MURMURS IN SOLDIERS.

To the Editor of THE LANCET.

SIR,—I beg to offer a few remarks on this subject before it passes from review, as I have had it under observation for several years and am, perhaps, in a position to throw some further light on it. I gave a brief account of the murmurs in question in 1913,<sup>1</sup> and a somewhat fuller one under the title of the "Soldier's Heart" last year.<sup>2</sup> In the latter I pointed out that "in many cases the murmurs subside under firm pressure of the chest-piece of the stethoscope against the thoracic wall and return under a lighter touch," and suggested that the apparent vigour of the heart's action and increase in the force of the apex beat, together with diffusion of its area, are due to deficiency or absence of the normally intervening cushion of lung, while firm pressure on the ribs, inhibiting the megaphonic effect of vibration, at once reduces the sounds to their actual value, which is characteristic of deficiency rather than increase of energy, such as obtains in hypertrophy. I have observed the occurrence of the same phenomenon during accesses of paroxysmal tachycardia and its subsidence as soon as the action of the heart returns to its normal frequency. As far as I am aware, it has not as yet been recorded that similar acoustic results may in like manner be elicited in simple dilatation of the aorta, whether due to atony or inflammation, and will assist in differentiating that condition from the early stage of aneurysm.

Up to the time of the war my observations were mainly made on public school boys, and in a less degree on the more mature subjects to be found among undergraduates, who had sustained dilatation of special incidence on the right heart as the result of long-distance running or boat-racing. Subjects whose cardiac and arterial walls have been weakened by toxæmia, mostly of alimentary origin, are specially prone to develop such murmurs. As Professor Drummond insists they are quite distinct from those due to dilatation of the orificial rings and from cardio-respiratory bruits. His observation that in some cases they are audible only when the patient is lying on his left side is new to me, but it seems to support the explanation which I have offered. In any case, their inconstancy and variability stamp them, in common with all murmurs dependent on or largely influenced by posture, as not being of organic origin.

I am, Sir, yours faithfully,

W. BEZLY THORNE.

<sup>1</sup> Proceedings of Royal Society of Medicine, 1913, vi., 93-97.

<sup>2</sup> Practitioner, May, 1916.

HARVEIAN SOCIETY OF LONDON.—Mr. J. Ernest Lane will deliver the Harveian lecture on the Treatment of Syphilis at the Stafford Rooms, Tichborne-street, Edgware-road, W., on Thursday, March 22nd, at 8.30 P.M.

Mrs. Tubby, the wife of Colonel A. H. Tubby, F.R.C.S., consulting surgeon with the Forces, has received the bronze medal and certificate of the Royal Humane Society for the gallant rescue from drowning of two Egyptian ladies.

NATIONAL COUNCIL FOR COMBATING VENEREAL DISEASES.—At a meeting held at 1, Wimpole-street on Monday last it was decided to establish a London and Home Counties Branch of the National Council. Lord Sydenham, who presided, stated that the branch was to be entirely independent of the National Council, which would assist it in every possible way, retaining the censorship of all literature issued. An executive committee of 30 was appointed representing the various medical, social, and administrative bodies concerned.

## The War.

### THE CASUALTY LIST.

The following names of medical officers appear among the casualties announced since our last issue:—

#### Killed.

Lieut. C. Stiebel, I.M.S., was educated at Clifton and at Cambridge, and was a student at St. Thomas's Hospital, London, qualifying in 1902. He had held appointments at the West London Hospital, at Bradford Infirmary, and at St. Marylebone Infirmary, afterwards proceeding to India to work as a medical missionary, and later joined the Indian Medical Service. On the outbreak of war he went to Alexandria and afterwards to the Dardanelles and to Mesopotamia.

Capt. J. E. Milne, D.S.O., R.A.M.C., was educated at Aberdeen University, and qualified in 1891. He joined the R.A.M.C. in October, 1915, and was awarded the D.S.O. for gallantry on the Somme. Prior to joining the Army he had a large practice in Aberdeen.

Capt. J. A. Harper, R.A.M.C., attached Yorkshire Regiment.

#### Died of Wounds.

Capt. E. W. S. Martin, R.A.M.C., attached Worcester Regiment, was educated at Queen's College, Belfast, and qualified in 1899. He was in practice in the Rhymney Valley of Monmouthshire, where he held several public appointments, prior to the outbreak of war, and after joining up he went to Malta and afterwards to Mesopotamia.

Capt. J. R. Macallan, R.A.M.C., attached East Lancashire Regiment, qualified in 1910 at Glasgow.

#### Wounded.

Capt. F. E. Chapman, R.A.M.C.  
Capt. C. O'Brien, R.A.M.C.

### DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

Second Lieut. G. S. Cooper, Northamptonshire Regiment, only son of Dr. H. S. Cooper, of Yaxley, Peterborough.

Capt. J. B. Ford, Royal West Kent Regiment, only child of Surgeon-General Sir R. W. Ford, D.S.O.

Lieut. F. E. S. Townsend, Durham Light Infantry, eldest son of Dr. F. E. Townsend, of Normanby, Yorks.

Lieut. A. E. Townsend, Durham Light Infantry and Royal Flying Corps, second and last surviving son of Dr. F. E. Townsend, of Normanby, Yorks.

Capt. N. West, M.C., Bedford Regiment, second son of Capt. C. J. West, R.A.M.C., of Newbury, Berks.

### MENTIONED FOR WAR SERVICES.

The Secretary of State for War has issued a long list of names which have been brought to his notice for valuable services rendered in connexion with the war, and the names of the following medical officers are included:—

#### Army Medical Service.

Adams, Col. G. G.; Beamish, Col. J. M.; Bedford, Surg.-Gen. W. G. A.; C. B., C. M. G.; Birch, Col. de B., C. B., V. D.; Birrell, Surg.-Gen. W. G.; Bond, Hon. Col. G. J.; Bull, Col. W. H. V. D.; Burnside, Col. E. A.; Butt, Col. E.; Coates, Col. W., C. B.; Croly, Col. A. E. J.; Culling, Surg.-Gen. J. C.; Dewar, Col. T. F.; Faunce, Col. C. E.; Forman, Col. R. H.; Giles, Col. P. B. C. B.; Gore, Col. St. J. C.; Griffiths, Col. J.; Hathaway, Surg.-Gen. H. G.; C. B.; Hind, Lt.-Col. W.; Hoyland, Col. S. S.; Jencke, Surg.-Gen. F. J.; Jennings, Col. R.; Klinnear, Col. W.; Lucas, Col. T. J. R. C. B.; May, Col. W. A., C. B.; Oliver, Col. C. P.; Peterkin, Col. A., ret. pay; Raywood, Col. J. R. I.; Russell, Col. A. F., C. M. G., ret. pay; Rutherford, Col. J. V. W., V.D.; T. F. Res.; Todd, Col. O.

#### Royal Army Medical Corps.

Abrahams, Temp. Capt. A.; Anderson, Maj. J. A.; Anderson, Lt.-Col. J. B.; Andersou, Maj. R. Y.; Annis, Capt. E. G.; Averill, Lt.-Col. C.

Bartholomew, Maj. E. U.; Batterby, Lt.-Col. J., ret. pay, late R.A.M.C.; Baxter, Capt. A.; Bennett, Capt. J. A.; Biggs, Maj. G.; Bolam, Lt.-Col. E. A.; Bond, Lt.-Col. R. P.; Bstock, Lt.-Col. J. S.; Bramhall, Maj. C.; Broderick, Capt. F. W.; Brown, Lt.-Col. H. H.; Buchanan, Lt.-Col. J. B. W., ret., late R.A.M.C.; Buchanan, Temp. Capt. E.; Burgess, Lt.-Col. (temp Col.) F. C.; Bush, Lt.-Col. J. P., C. M. G.

Caldwell, Lt.-Col. R.; Callam, Lt.-Col. A.; Callender, Lt.-Col. E. M.; Carter, Temp. Maj. A. H.; Carter, Temp. Maj. (Lt.-Col. T. F. Res.) T. M.; Causton, Temp. Capt. E. P. G.; Chambers, Maj. A. J., ret.; Charlesworth, Lt.-Col. H., C. M. G., ret.; Childe, Lt.-Col. C. P.;

Connel, Lt.-Col. A.; Corkery, Lt.-Col. M. P.; Cozens, Capt. W. B.; Coward, Temp. Maj. H. G.; Cox, Maj. J. J.; Crooke-Lawless, Surg. Lt.-Col. W. R., late C. Gds., attd. R.A.M.C.

Daly, Temp. Capt. U. C. de B.; Davies, Temp. Capt. F. J. P.; Dodd, Lt.-Col. A.; Drew, Capt. C. M.; Duggan, Maj. O. W.

Eames, Capt. (temp. Lt.-Col.) C. W.; Ellis, Temp. Lt.-Col. F. W.; Evans, Lt.-Col. D. E.; Ewing, Temp. Capt. J.

Faichnie, Lt.-Col. N.; Falkner, Maj. M. W.; Farquharson, Capt. (temp. Maj.) A. C.; Fenwick, Lt.-Col. B. H.; Ferness, Maj. J. C.; Fleming, Temp. Maj. S.; Ford, Surg.-Gen. R. W., C.B., D.S.O.; Fothergill, Temp. Capt. E. R.; Fowler, Maj. C. E. P.; Franklin, Lt.-Col. D. F., ret. pay, late R.A.M.C.

Gabriel, Maj. W. M.; Gemmel, Lt.-Col. A. B.; Gibbon, Temp. Lt.-Col. T. H.; Gillies, Temp. Capt. H. D.; Gillespie, Temp. Maj. D.; Gippa, Temp. Maj. A. G. P.; Gowans, Lt.-Col. T.; Grey, Maj. E. Haig, Lt.-Col. P. B.; Hall, Lt.-Col. R. H.; Hall-Edwards, Temp. Maj. J.; Hamilton, Lt.-Col. T. W. O'H., C.M.G.; Harrison, Lt.-Col. L. K.; Haslam, Lt.-Col. W. F.; Hawkins, Lt.-Col. H. P.; Haydon, Lt.-Col. T. H.; Henry, Maj. R. W. W.; Hernaman-Johnson, Temp. Capt. F.; Holmes, Capt. W. M.

Jamieson, Maj. J. K.

Kay, Lt.-Col. A. G., ret. pay, late R.A.M.C.; Kaye, Lt.-Col. J. R.; Kearney, Lt.-Col. J., ret. pay, late R.A.M.C.

Lamballe, Maj. F. W.; Lambert, Lt.-Col. F. S.; Leebody, Maj. H. A.; Le Queune, Lt.-Col. F. S., V.C.; Lister, Capt. (temp. Lt.-Col.) W.; Littlewood, Lt.-Col. H.

McGillivray, Capt. A.; McGrigor, Capt. H. J., Reserve of Officers; McLeish, Temp. Capt. D. J.; MacMillan, Temp. Capt. J. M.

Maconachie, Lt.-Col. J., ret. pay, late R.A.M.C.; Magrath, Lt.-Col. C. W. S.; Manning, Temp. Maj. N. S.; Mant, Temp. Capt. H. T.; Marsh, Lt.-Col. F.; Marshall, Temp. Lt.-Col. W. L. W.; Maurice, Lt.-Col. W. J.; Maynard, Lt.-Col. E. F.; Miles, Temp. Lt.-Col. G. E.; Miller, Temp. Hon. Maj. C. H.; Moir, Maj. J. D., Res. of Off.; Moore, Lt.-Col. R. R. H.; Morris, Lt.-Col. A. H.; Morris, Temp. Lt.-Col. R. J.; Morse, Lt.-Col. R. E. R., ret. list; Mort, Temp. Lt.-Col. S.; Muir, Temp. Capt. G.; Murphy, Lt.-Col. Sir S. F.; Myddleton-Gavey, Maj. E. H.; Myles, Maj. E. H., ret. pay, late R.A.M.C.

Nichols, Lt.-Col. F. P.; Nicholson, Lt.-Col. J. E., ret. pay, late R.A.M.C.

O'Connell, Lt.-Col. M. D., ret.; Oldfield, Lt.-Col. J.; O'Reilly, Maj. P. S.; Orton, Lt.-Col. D. C. L.

Paton, Temp. Capt. R. R. K.; Patterson, Maj. D. W.; Pechell, Capt. H. J.; Pilcher, Lt.-Col. and Bt. Col. H. M., D.S.O.; Pirie, Maj. J. H. H.; Probyn, Lt.-Col. P. J., D.S.O.

Ranking, Lt.-Col. G. S. A., late I.M.S.; Roberts, Temp. Maj. H. J.; Rocroft, Lt.-Col. (Hon. Surg.-Col., temp. Col.) W. M.; Ruthven, Capt. M. W., Spec. Res.

Salvage, Lt.-Col. J. V., ret. pay; Sedgwick, Temp. Capt. H. R.; Shirley, Temp. Maj. H. J.; Slerry, Maj. H. W.; Simpson, Col. R. J. S.; Sinclair, Maj. W. V.; Spencer, Temp. Maj. G. H.; Steele, Lt.-Col. W. H., ret. pay; Stewart, Temp. Capt. J. S.; Stott, Maj. H.; Swabey, Lt.-Col. L. W.

Tatham, Lt.-Col. C. J. W. (ret.); Taylor, Temp. Capt. J.; Thiele, Lt.-Col. C. W., ret. pay; Tidbury, Lt.-Col. J.; Tooth, Temp. Col. H. H.; Trower, Temp. Capt. A.; Turle, Capt. J. H.; Turner, Lt.-Col. W., ret. pay.

Vincent, Temp. Lt.-Col. W. J. N.

Wakeling, Temp. Capt. T. G.; Wallace, Maj. D., C.M.G.; Watson, Maj. G. W.; Webber, Lt.-Col. H. W.; Weeks, Temp. Capt. H. H.; White, Lt.-Col. S.; Whitestone, Lt.-Col. C. W. H.; Whitty, Lt.-Col. M. J., ret. pay; Williamson, Temp. Capt. J. R.; Wilson, Maj. A.; Wilson, Lt.-Col. G., ret. pay; Winter, Lt.-Col. T. B.; Wirgman, Capt. C. W.; Wishart, Temp. Capt. W. H.; Wolstenholme, Capt. (temp. Maj.) T. B.; Woodhead, Lt.-Col. G. S.; Woods, Temp. Capt. L. D.; Woodward, Temp. Lt.-Col. A. S.; Woodyatt, Temp. Lt.-Col. J. F.; Wrangham, Temp. Lt.-Col. W. M. D.

*Indian Medical Service.*—Barry, Lt.-Col. T. D. C.; Collie, Lt.-Col. M. A. T., ret. pay; Crawford, Lt.-Col. D. G., ret. pay; King, Col. W. G.; Lowtas, Lt.-Col. J., ret. pay; Quayle, Col. W. A., ret.; Ricketts, Lt.-Col. W. S. P., ret.; Smith, Lt.-Col. J. C., ret. pay; Thompson, Lt.-Col. H. J., ret. pay.

*South African Medical Corps.*—McGrigor, Lt.-Col.; Mursell, Lt.-Col.; Pearson, Maj. M. G.; Robertson, Capt. G. W. S.; St. Leger, Maj. A. T.; Thornton, Lt.-Col. E. N. A.

*Australian Infantry Force.*—Fetherston, Col. (temp. Surg.-Gen.) R. H. J.

*Canadian Army Medical Corps.*—Allen, Capt. M. H.; Bagnall, Capt. A. W.; Barrigar, Capt. C. A.; Bayley, Capt. B. M.; Bell, Maj. F. C.; Bouthellier, Capt. G.; Bowie, Maj. R.; Bowman, Capt. F. B.; Bridges, Col. J. W.; Brousseau, Lt.-Col. J. D.; Buell, Lt.-Col. W. S.; Cameron, Lt.-Col. I. H.; Chambers, Lt.-Col. G.; Clarke, Maj. D. A.; Courtenay, Lt.-Col. J. D.; Doherty, Maj. C. E.; Drum, Capt. Col. L.; Finley, Capt. Col. F. G.; Goodall, Capt. J. R.; Hale, Capt. G. C.; Irving, Maj. L. B. W., D.S.O.; Lomas, Capt. A. J.; McGaffin, Capt. D. W.; MacKenzie, Capt. W. J.; McPherson, Maj. A. W.; McPherson, Lt.-Col. D. W.; Meekins, Maj. J. C.; Mercereau, Capt. H. C.; Mewburn, Lt.-Col. F. H.; Neff, Capt. H. A.; Orr, Capt. H.; Paul, Capt. H. E.; Reason, Maj. C. H.; Reennie, Col. G. S.; Russell, Maj. C. K.; Scott, Col. W. A.; Smith, Maj. S. A., D.S.O.; Starkey, Maj. T. A.; Stevenson, Lt. G. J.; Thomas, Capt. R. W.; Warner, Capt. E. L.; Watt, Lt.-Col. W. L.; Williamson, Capt. H. J.; Wilson, Maj. H.; Young, Maj. C. A.

*Ceylon Volunteer Medical Corps.*—Rockwood, Major D.

*Hong Kong Volunteer Corps.*—Black, Surg.-Maj. G. D. R.

*Royal Malta Artillery.*—Misaud, Surg.-Maj. A. H.; Randon, Surg.-Maj. R.

*King's Own Malta Regiment of Militia.*—Samut, Surg.-Maj. R.

*British Red Cross and Order of St. John.*—Samut, Lt.-Col. R. P. P.

*New Zealand Medical Corps.*—Barnett, Maj. (temp. Lt.-Col.) L. E.; McKibbin, Capt. T.; Mill, Maj. (temp. Lt.-Col.) T.; Myers, Lt.-Col. B.; Parkes, Col. W. H., C.M.G.; Short, Capt. H.; Wyke, Maj. (temp. Lt.-Col.) D. S.

*Miscellaneous Services.*—Aikmen, Surg.-Col. J., Principal Medical Officer, R. Guernsey Mill.; Bentif, Surg.-Lt.-Col. P. B., Med. Corps, Jersey Mill.; Bostock, Surg.-Capt. R. A., ret. Res. of Off., S. G. Gds.

Bradshaw, Fleet-Surg. F. R. N., ret.; Burton, Fleet-Surg. E. T. R. N.; Fawcett, Surg.-Gen. W. J., C.B., ret. pay; Gallwey, Surg.-Gen. Sir T. J., K.C.M.G., C.B.; Launder, Surg.-Maj. H. E., Hampshire R.

### THE NATIONAL SERVICE DEPARTMENT AND THE ORGANISATION OF THE MEDICAL PROFESSION FOR MILITARY AND CIVILIAN PURPOSES.

The following letter has been sent by the Director-General of National Service to the Central Medical War Committee, the Committee of Reference of the English Royal Colleges, and the Scottish Medical Service Emergency Committee:

National Service Department, St. Ermin's, Westminster, S.W., Feb. 22nd, 1917.

Sir.—The organisation of the medical profession with a view to meeting the needs both of the military and civil population is one with which this department is now concerned. Up to the present the work of providing the Army with qualified medical men has been undertaken by the Central Medical War Committee with the assistance of the Committee of Reference for England and Wales and the Scottish Medical Service Emergency Committee. It is clear, therefore, that in considering what further steps should be taken these bodies should be consulted and their opinions fully considered. Accordingly I have decided to call a conference, comprising three representatives of the Scottish Medical Service Emergency Committee, four from the Central Medical War Committee, and two from the Committee of Reference, over which I have asked Sir Donald MacAlister, the President of the General Medical Council, to preside, and I should be very much obliged if your Committee would be good enough to nominate representatives from amongst their number who would be prepared to attend. Particulars of the time and place at which the conference will be held will be arranged as soon as the names of all the representatives have been received.

The chairman will be furnished with terms of reference, but for your information I may say that the following will be among the subjects upon which it is desired that the conference should express an opinion: (1) Whether the service to be given by members of the profession should be compulsory or voluntary; (2) what arrangements should be made for the collection and distribution of fees or other form of remuneration in cases where doctors leave their own practices or take on the practices of others; (3) what arrangements should be made: (a) centrally and (b) locally for redistribution of medical men; and (4) what should be the relations between any central executive or advisory body representing the profession and this department.

I am, yours faithfully,

A. NEVILLE CHAMBERLAIN, Director-General.

### SCOTTISH MEDICAL SERVICE EMERGENCY COMMITTEE.

At a conference held recently of the Committee and the secretaries of the Local War Committees for Scotland the following resolution was adopted unanimously:

That this Conference of Secretaries of Local War Committees being informed that further substantial calls are likely to be made on the profession is of opinion that these calls can only be met by mobilising the whole profession.

### THE "C" DISINFECTING FLUID.

The Medical Department of the Navy employed at Gallipoli a preparation known as the "C" disinfecting fluid, which under trial has proved so useful in prevention of the decomposition of carcasses that we cannot help wondering why more has not been heard of the invention and why its use has not become more general. The fluid was devised and standardised at the Pathological Laboratory at Cambridge, and the ideals set forth for it may be briefly summarised as follows: The preservation and deodourising of carcasses of animals and the prevention of the deposit of fly eggs, the destruction of fly maggots developed from eggs deposited before the application of the chemical, a fly deterrent, and a general deodoriser. In November of 1915 Fleet-Surgeon D. W. Hewitt, F.R.C.S., was instructed by Sir Arthur May, the Director-General, to investigate for the Medical Department of the Navy the results of the experiments which had been carried out at Cambridge during a period of six months, and the gist of his report showed that the fluid is a very active disinfectant. The bodies of guinea-pigs, rabbits, goats, pigs, and horses had been exposed for various periods under conditions simulating those to be found in the actual zones of battle. They were grouped in three different areas separated by from two to three miles, presumably with the intention of negativing or minimising the influence of the soil, and they had all been exposed to open air, rain, and sunshine for periods varying from a fortnight to six or seven weeks. The fluid, the exact composition of which has not been made public—though it is, of course, known to Professor G. S. Graham-Smith, of the Pathological Laboratory at Cambridge—is a coal-tar preparation costing only 4*d.* a gallon, and as it can be obtained in large quantities it may be used undiluted. This, indeed, is one of its notable advantages, as no skill is required for making dilutions. Two gallons suffice for treating a horse, and Fleet-Surgeon Hewitt suggests that probably one gallon poured over the clothing of a dead man would be ample to arrest putrefaction.

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The methods of treatment of the various carcasses employed for experiment were described by Fleet-Surgeon Hewitt as threefold: the fluid can be brushed over the surface of the dead animal, or it can be injected into the carotid artery, or it can be introduced into openings made in the peritoneal and pleural cavities. Carcasses of different bulk were treated by each method, and were found to be deodorised, while putrefaction was greatly retarded or prevented and fly maggots were killed. The most effective technique was found to be the brushing over the surface of the carcass with the fluid, coupled with its injection into the carotid artery. The body of a horse treated in this way was perfectly fresh and odourless a fortnight later. Trenches and latrines when sprayed with the fluid were kept free from flies, which it kills as well as the maggots, and it prevents the ova from being deposited.

*Professor Graham-Smith's Description.*

The following is the routine as described by Professor Graham-Smith for the effective treatment of the carcass of a horse. The carcass should be injected through the carotid artery, using a pump delivering a quantity of "C" fluid from a container—the container used in the Cambridge experiments was the Excelsior 5970 (Benton and Stone, Limited, Birmingham). Two gallons of the fluid will be found sufficient for a horse weighing 1000 lb. The operation takes from 5 to 10 minutes. A further one gallon should be sprayed on the surface with a watering-can. The surface includes legs and feet, and both sides of the animal should be brushed in the direction of the hair which thoroughly distributes the fluid. More fluid should be poured in the ears, eyes, nostrils, mouth, anus, and any wounds. Patches of blood in the neighbourhood should be sprinkled. If the horse cannot be injected the abdomen should be opened in such a manner that the intestines do not fall out, and the intestines should be slashed so as to let out the gas. Then one gallon of the fluid should be poured in and more fluid should be poured into the pleural cavity through an opening between the ribs. Externally the treatment is the same as when the horse is injected, and a similar routine should be followed in dealing with a carcass already putrid, but if it is so offensive as to be unapproachable it can be sprayed at first from a distance. Treated in this way bodies will remain for days without any marked smell, and can be buried when time or opportunity permits. It is recommended that carcasses which are to be buried immediately should also be sprayed and the natural openings and any wounds also be injected, so as to prevent flies hatching out from the eggs which have been deposited.

Against flies, those ubiquitous disease-carriers in all warm zones, the "C" disinfecting fluid acts efficiently. Professor Graham-Smith says that treatment with the fluid will kill all maggots and will prevent flies from laying their eggs for some days, while even if the eggs are laid the maggots will not hatch out.

Flies can be prevented from entering a shelter, such as a dug-out, even if attractive baits are placed inside, by hanging a cloth sprayed with the solution over the entrance. Moreover, it has been found that the smells from putrefying carcasses or faeces are almost completely removed by the use of the fluid. The suggestion follows that probably flies could be kept from the trenches by spraying of the "C" fluid and from men's faces by anointing their caps. Professor Graham-Smith adds that at Cambridge there has not been any opportunity of carrying out experiments on fly-infested rooms, kitchens, and outhouses, but it can be assumed that by treating the floors, doors, and windows with "C" fluid most of the insects could be kept away from such premises and from horse-lines and latrines. The solution can be supplied at 4½d. per gallon in 40-gallon barrels or in 5 to 100-gallon drums, and Mr. F. W. Foreman, F.I.C., of the Cambridge Agricultural Department, who has been associated with Professor Graham-Smith in the work, says that 10,000 gallons could be supplied in a short time, and that the correct material will be supplied in response to orders sent through him. Mr. Foreman adds the following word of caution to men who are constantly using the solution. They should anoint their hands and arms with vaseline and should remember that contact with the fluid causes considerable local irritation to the mouth and eyes.

*A Trial at the Dardanelles.*

As the results of a trial of "C" fluid by a Royal Naval Division at the Dardanelles, Fleet-Surgeon Hewitt made a

further report in which he pointed out that the specific gravity of "C" fluid caused difficulty in obtaining a spray which would throw satisfactorily for more than 20 or 30 yards. Spraying is, of course, not necessary when opportunity occurs for the more effective methods of brushing with the fluid or injection of the fluid into the body, but in the near neighbourhood of trenches corpses of men and animals, and other putrefying material, may lie for some days before any opportunity of other treatment than spraying can be found.

The report from the Dardanelles was made by Staff-Surgeon E. L. Atkinson, and forwarded with a confirmatory report by Fleet-Surgeon Arthur Gaskell.

The following extracts from Staff-Surgeon Atkinson's report will show the scope of the inquiry made:

The body of a Turk killed eight days previously and buried three days in the parapet of a trench was exhumed. Decomposition was in full progress, the stench was terrible, and the carcass was covered with flies, which were breeding in it. The body was lying on its side, and was regarded as a typical case upon which to try the effect of the liquid. About one gallon of the liquid was squirted from a garden spray over the clothes and exposed parts on Oct. 9th, 1915. Some of the flies that were on the body were killed immediately, and the remainder repelled. The stench abated almost immediately. The corpse was left exposed as it was, and there had been a heavy thunderstorm on the previous night. It was not possible to turn it in the daytime because of sniping. On the 11th there was complete absence of smell, only a few flies settled on it for a short time. A further half-gallon was sprayed over it and again on the 12th; there was no smell or flies. The size of the body had markedly shrunken and the result was extremely satisfactory. Again, three or four bodies immediately behind the firing-line were sprayed from a short distance with the fluid. The men had been dead for some time and the smell in the trench from the bodies was very offensive. The smell was damped down entirely by the fluid.

"In trench warfare," says Staff-Surgeon Atkinson, "the use of this substance ought to be invaluable. So many dead are lying within reach of a strong spray from the trench, and these cannot be buried because they are between the enemy and ourselves. It will also certainly repel fly and their breeding in these bodies; also the effect seems to last over an appreciable time." He mentions the need for a forcible pump so as to project a long spray, and notes also the satisfactory use that can be made of the fluid in the deodorising of manure-heaps and latrines.

He summarises his investigations as follows:—1. The fluid is an excellent deodorant. 2. Its effect on decomposition lasts some time—in one very advanced case seven days under observation. 3. It kills flies by spraying them in clusters, and in sufficient quantity repels them for some days from settling on the place sprayed. 4. In dealing with manure spreading in layers and spraying daily would probably be useful.

Fleet-Surgeon Gaskell supplies notes on the trials of the fluid undertaken at the Dardanelles which support Staff-Surgeon Atkinson's conclusions, and adds a note of warning in respect of its extreme inflammability.

**THE ARTIST AT THE FRONT.**

The third instalment of drawings by Mr. Muirhead Bone, issued from the office of *Country Life*, under the title *The Western Front*, by Messrs. George Newnes, Ltd., contains several striking illustrations made in British munition works. Three drawings, entitled "The Gun-pit," show the hardening of the steel, a gun jacket entering the oil-tank, and the great crane which lifts the guns about from furnace to tank and from tank to lathe. They form a fitting introduction to a picture of a vast shell store entitled "The Hall of the Million Shells," and to another reproduced on the frontispiece, entitled "Mounting a Great Gun," wherein the horror of these enormous instruments of death is lost, unless it is accentuated by the serenity of their appearance, which comes of their perfect strength and symmetry.

Other notable drawings in this instalment, notable mainly because they enable us to realise what is really going on at the front, are "A Line of Tanks," "A Kitchen in the Field," a disembarkation scene, and "Thawing Out," which records in a lively manner the bitter cold to which the aviator has to submit. In the first plate, an illustration of the market square at Caesel, Mr. Muirhead Bone is at his best as a chronicler of the graces and spaces of an ancient city.

## Obituary.

**THOMAS SEYMOUR TUKE, M.A., M.B., B.CH. OXON.,  
LECTURER ON MENTAL DISEASES AT ST. GEORGE'S HOSPITAL, LONDON.**

We much regret to announce the death, in his sixty-second year, of Dr. T. S. Tuke, who has fallen a victim to pneumonia following rapidly upon an apparently simple cold.

Thomas Seymour Tuke was the son of Dr. Harrington Tuke, who in the last generation was a leading consultant physician for mental disorders, and he was the grandson of the famous Dr. John Conolly, associated in this country with the abolition of mechanical restraint in the treatment of the insane. Young Tuke was educated at St. Paul's School and, winning a scholarship, proceeded to Brasenose College, Oxford, and later to St. George's Hospital. At school and college he developed the love of sport which remained with him throughout his life. He became a useful cricketer and a fine horseman as well as a good shot, and at St. George's Hospital he made a leisurely passage through his examinations and added to the already large number of personal friends which his kindness of heart, charm of manner, and love of games had acquired for him at school and college. It was not until after Tuke graduated in medicine at Oxford that he showed his real quality as a physician. Bred from his earliest years in association with the most humane treatment of mental sufferers, he rapidly developed into a skilful adviser. On the practical side of treatment he was especially helpful, and he had strong views as to the necessity of long training by residence with the insane for those who would dictate their treatment. He frequently insisted on the dangers which might follow on the existing fashion of placing insane patients in ordinary nursing homes or with inexperienced guardians, and he spoke from the full knowledge of his subject gained as co-licensee with his brother, Dr. Charles M. Tuke, of Chiswick House. Appointed lecturer on mental diseases at St. George's Hospital, his instruction to the students was always of a practical character; and, as a matter of fact, he conducted no original researches, but his general advice on matters connected with lunacy to those of the students who intended to become general practitioners was exactly what they required.

By the death of Dr. Tuke there is removed from among us one of the kindest and most sympathetic of men, who discharged his professional duties with the highest appreciation of their importance and delicacy. He married a daughter of the late Dr. Graily Hewitt, the well-known obstetric physician, in 1890, and his wife and daughter survive him. In THE LANCET of May 22nd, 1915, we announced the death in the war of his only son, Second Lieutenant A. H. S. Tuke.

## Medical News.

**WEST LONDON MEDICO-CHIRURGICAL SOCIETY.**—At a meeting to-day (Friday, March 2nd), in the society's rooms at the West London Hospital, a paper will be read by Mr. Aslett Baldwin on "Some Mistakes in Diagnosis."

**ROYAL MEDICAL BENEVOLENT FUND.**—At the last meeting of the committee, held on Feb. 13th, 20 cases were considered and £162 granted to 15 of the applicants. Four of the applicants were elected to vacant annuities. The committee also decided to increase the number of annuities by 12. The following is a summary of the cases relieved:—

Widow, aged 40, of F.R.C.S. Eng. who practised in Rotherhithe and died in 1913. Applicant was left without means and decided to endeavour to earn a living by taking paying guests, and took a house in June 1914, on three years' lease on the Kent coast. The prospects were bright, but the war stopped all visitors, and she has had the house on her hands and had to work as a nurse to pay the rent. The landlord will release her of her responsibility if she pays £10, so she wants the loan of that amount. One son is a foundation scholar at Epsom. Voted £10.—Widow, aged 42, of M.B., C.M. Gasq., who practised at Blackpool and died in 1911. Applicant was left without means with one daughter, aged 8 years. She went to America, and was able to earn a living for a time, but owing to her health breaking down she returned to England. At the present time her health is very bad, and the Glasgow branch of the Guild have provided her with a temporary home and are giving her invalid comforts. The daughter, now 14 years of age, is earning 8s. per week; this is the only income. Voted £12.—M.D. St. And., aged 72, and married. Was a missionary in India,

and afterwards for many years practised in the City of London. Lost his practice through the premises he occupied being required for City improvements, and he was not properly compensated. Has recently had an hemiplegic attack and quite unable to work. Voted £5.—Daughter, aged 43, of L.R.C.P. Eng. who practised at Wymondham and died in 1882. Applicant was left entirely without means and went with her mother to France, where they acted as governesses. The mother died, and the applicant, who had never been strong, returned to England and tried to earn a living by teaching French and Spanish, but was not very successful. At the present time is in great poverty, and health very bad. Relieved twice, £7, in 1911. Voted £7.—Daughter, aged 57, of M.R.C.S. Eng. who practised at Rotherhithe and died in 1879. Applicant suffers from chronic glaucoma, and before this earned a living as a nurse. Only income £24 from friends, and small investment. Relieved eight times, £79. Voted £12 in 12 instalments.—Widow, aged 70, of M.D. St. And. who practised at Kidderminster and died in 1884. Applicant was left with less than £50 per annum, and tries to supplement this by taking in lodgers, but owing to ill-health and age cannot continue to do this. Relieved twice, £22. Voted £12 in 12 instalments.—Widow, aged 69, of M.R.C.S. Eng. who practised in London and died in 1893. Applicant is a cripple, and only able to earn very little as an artist. She owns a house which is let, but owing to its being in such a bad state of repair practically all the rent goes in repairs. Relieved twice, £22. Voted £12 in 12 instalments.—Daughter, aged 60, of M.R.C.S. Eng. who practised at Box, Wilts, and died in 1894. Has two sisters who are invalids partly dependent on her. Only able to earn about 2s. a month as a companion. One of her sisters is helped by the Fund and the Guild. Relieved eight times with sister, £126, and self three times, £48. Voted £18 in 12 instalments.—Daughter, aged 43, of M.R.C.S. Eng., who practised at Scarborough and died in 1879. Was left without means, and owing to ill-health not able to earn sufficient by nursing to pay her way. Relieved 12 times, £117. Voted £10 in two instalments.—Daughter, aged 55, of F.R.C.S. Eng. who practised at Bedford and died in 1890. Applicant, whose health is very indifferent, earns a little in domestic service, but health will not permit her continuing in one place long. Has recently poisoned her thumb and is in great distress. At the request of the Guild visitor an emergency grant of £2 has been sent to her. Relieved 11 times, £28. Voted £12 in four instalments.—Widow, aged 60, of M.R.C.S. Eng. who practised at Hexham and London, and died in 1908. Was left entirely without means and endeavour to earn a living by taking in lodgers. Has one daughter, a teacher, who earns 2s. per week, and this is the only certain source of income. Relieved seven times, £84. Voted £12 in 12 instalments.—Wife, aged 50, of M.R.C.S. Eng., a Major in the R.A.M.C. She was deserted by her husband nine years ago and left with a delicate daughter now 29 years of age. Through the illness of her daughter, and the fact that her husband's allowance was stopped for 18 months, she has got into temporary financial difficulties, and owes for her removal expenses to her present home and for other items. Her prospects are good if she can obtain help now. Relieved twice, £20, in 1913. Voted £50 from Fund and Guild.—Daughter, aged 52, of M.R.C.S. Eng. who practised at St. Clears and died in 1878. Applicant suffers from double spinal curvature. Her mother is an annuitant of the Fund. Relieved three times, £18. Voted £6 in 12 instalments.—M.R.C.S. Eng., aged 49, who practised mainly in West Africa. He is totally incapacitated from work due to stroke and other trouble. Lives with an aunt whose means are very limited. A relative allows £24 a year. Relieved three times, £25, last £5 in June, 1916, with permission to apply again in six months. Voted £5.—Daughter, aged 69, of M.R.C.S. Eng. who practised at Battle, Sussex, and died in 1873. Lives with sister, who can only help her a little. Suffers from rheumatism and bad sight. Relieved 33 times, £226. Voted £12 in 12 instalments.—Widow, aged 48, of M.R.C.S. Eng. who practised at Deal and died in 1904. Only income £20 from dividends. Shares home with mother and sister whose means are limited. Unable to meet expenses owing to the high cost of food. Voted £10 in two instalments.

Subscriptions may be sent to the honorary treasurer, Dr. Samuel West, at 11, Chandos-street, Cavendish-square, London, W.

## Parliamentary Intelligence.

### NOTES ON CURRENT TOPICS.

#### Legislation on Venereal Diseases.

It is anticipated that a Bill dealing with certain matters in relation to venereal diseases will be introduced in the House of Commons at no distant date on behalf of the Local Government Board. The Criminal Law Amendment Bill, which is under the care of the Home Secretary, contains a clause imposing penalties on persons who knowingly communicate venereal disease to others. It was read a second time last week and was formally referred to "a Committee of the whole House." A suggestion was made that this decision should be rescinded and that the measure, along with the promised Bill of the Local Government Board, should be dealt with by a Grand Committee—that is, a committee on which selected Members of the House sit. The idea is that this course would secure continuity of outlook in dealing with the details of both measures. The Government has given its assent to this suggestion, and, so far as the Criminal Law Amendment Bill is concerned, a resolution has been passed which will have the effect of sending it to a Grand Committee for detailed consideration.

#### Use of Cocaine in Dentistry.

The Committee which has been considering questions with regard to the use of cocaine in dentistry, particularly by unregistered practitioners, has made its report to the Home

Secretary. Sir GEORGE CAVE has laid it on the table of the House of Commons. He intimates that the report raises some questions which will require consideration. He proposes for that reason to extend for two months the permit to unregistered practitioners in dentistry to use solutions containing not more than 1 per cent. of cocaine.

## HOUSE OF COMMONS.

WEDNESDAY, FEB. 21ST.

## Medical Notes of Wounded Men.

Mr. SNOWDEN asked the Under Secretary for War what medical notes had been, or were now, sent with wounded men from Flanders; and whether arrangements would be made to permit a wounded man being accompanied by medical notes on his own case, and the details of treatment carried out, so as to avoid delay and unnecessary manipulation on his arrival in England.—Mr. MACPHERSON answered: Each man has attached to his coat a card giving particulars of the case. Improvements of this card are now being carried out and a fuller history of the case will be given.

THURSDAY, FEB. 22ND.

## "Manipulative" Surgery.

Mr. MACVEAGH asked the Under Secretary for War whether the Army Medical Department was aware that the Medical Act of 1858 applied only to persons falsely styling themselves physicians, doctors of medicine or surgery, or surgeons; whether the department was also aware that experts in manipulative treatment did not come within any of those descriptions, did not so style themselves, and had never asked to be so employed; and whether he could state what section of the Act could, under those circumstances, be construed as preventing the department from using the services of these experts.—Mr. MACPHERSON wrote in reply: No, sir, I am not aware that my honourable friend's interpretation of the Medical Act is correct. I think if he refers to the Act he will find that it prohibits the appointment of any person as a medical officer unless he is registered. Every branch of medicine and surgery pursued by lawfully qualified medical men is represented amongst those employed by us.

Mr. MACVEAGH asked whether the Army Medical Department was yet in a position to say whether the British Medical Committee (Balneological Section) had reported on the use of manipulative treatment in France; and whether the Army Medical Department in this country proposed also to make use of every possible aid for wounded soldiers.—Mr. MACPHERSON replied: Yes, sir. They have reported on certain methods of treatment, all of which are in use in this country.

Answering further questions, Mr. MACPHERSON wrote: Any professional degree recognised by the law of the land is recognised by the Army Medical Service. The so-called manipulative treatment is in full swing in the Army under well-known authorities on the subject. My honourable friends who take an interest in the subject of manipulative treatment may rest assured that facilities for discussion will be afforded at an early date on the introduction of the Army Estimates.

## Epileptics amongst Discharged Soldiers.

Answering Mr. KING, who asked a question bearing on the treatment of epileptics discharged from the Army, Sir A. GRIFFITH-BOSCAWEN (representing the Ministry of Pensions) wrote: The Minister of Pensions has no precise information as to the number of persons who have become epileptics subsequent to enlistment, but I am advised that it is not large. The treatment and training of epileptics is, however, being carefully considered. A scheme has been approved by the Statutory Committee for additions to the accommodation at Chalfont Colony, and a special joint committee on institutional treatment, who have secured the services of an expert medical man, are considering the further steps to be taken.

WEDNESDAY, FEB. 28TH.

## Venereal Disease in the Army.

Answering Mr. KING, who asked for figures of cases of venereal diseases in the Army, Mr. MACPHERSON (Under Secretary for War) wrote: The present admission ratio for troops in the United Kingdom is 43·5 per 1000 per annum. This figure is a reduction on that furnished on Nov. 16th. In France the proportion is 24 per 1000.

The following journals, magazines, &c., have been received:—Journal of Anatomy, Maryland Medical Journal, Archives of Radiology and Electrotherapeutics, Surgery, Gynecology, and Obstetrics, American Journal of Syphilis, American Journal of Roentgenology, Bulletin of the Johns Hopkins Hospital, Medical Review of Reviews, American Journal of Public Health, Ellingswood's Therapeutist, Medical Times, Clinical Medicine, Pediatrics, Malaria, Psychoanalytic Review, American Journal of Obstetrics, Modern Hospital, American Journal of Medical Sciences, Journal of Mental Science, Military Surgeon, American Journal of Orthopedic Surgery.

## Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index). When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

APPLECROSS, PARISH OF, ROSS-SHIRE.—Medical Officer, &c., for Torricon District. Estimated emoluments £350 per annum.

ASHTON-UNDER-LYNE, LANC., DISTRICT INFIRMARY AND CHILDREN'S HOSPITAL.—Assistant House Surgeon. Salary £160 per annum, with usual emoluments.

BEDFORD COUNTY HOSPITAL.—House Physician, unmarried. Salary £150 per annum, with board, &c.

BIRMINGHAM AND MIDLAND EYE HOSPITAL.—Female House Surgeon. Salary £200 per annum.

BIRMINGHAM CITY.—Assistant Tuberculosis Officer for West Heath Hospital and Assist at Anti-Tuberculosis Centre, Broad-street. Salary £350 per annum, with board, &c.

BRISTOL ROYAL HOSPITAL FOR SICK CHILDREN AND WOMEN.—Female House Surgeon. Salary £150 per annum, with board, &c.

BRISTOL ROYAL INFIRMARY.—House Physician and House Surgeon. Salary at rate of £120 per annum, with board, &c.

BURNLEY, VICTORIA HOSPITAL.—House Surgeon. Salary £160 per annum, with board, &c.

BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.

CAMBRIDGE, COUNTY MENTAL HOSPITAL.—First Assistant Medical Officer. Also Junior (Second) Assistant Medical Officer, unmarried. Salaries £300 and £220 respectively, with board, &c.

DUNDEE DISTRICT ASYLUM.—Assistant Resident Medical Officer. Salary £300 per annum, with board, &c.

GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon. Salary £200 per annum, with board, &c.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.—House Physician for six months. Salary 30 guineas.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.—Assistant Casualty Medical Officer. Salary at rate of £60 per annum, with board, &c.

LONDON COUNTY COUNCIL.—Two Female Medical Inspectors (unmarried or widows) in the Public Health Department. Salary £300 a year.

MANCHESTER, ABERGLEN SANATORIUM.—Temporary Medical Superintendent. Salary £300 per annum, &c.

MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Park-place, Cheetham Hill-road.—House Surgeon. Salary £120 per annum, with board, &c.

NEWCASTLE UPON-TYNE EDUCATION COMMITTEE.—Temporary Assistant School Medical Officer. Salary £300 per annum.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford.—House Surgeon.

SALFORD ROYAL HOSPITAL.—Junior House Surgeon. Salary at rate £150 per annum, with board, &c.

SOUTHAMPTON PARISH INFIRMARY, Shirley Warren.—Resident Assistant Medical Officer. Salary £250 per annum, with apartments, &c.

SOUTHAMPTON, ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL.—House Physician and Junior House Surgeon. Salaries £150 and £120 per annum respectively, with board, &c.

SUNDERLAND ROYAL INFIRMARY.—Female House Surgeons. Salaries—Senior, £260; Junior, £200 per annum, with board, &c.

WEST HAM UNION SICK HOME, 86, Forest-lane, Forest Gate, E.—Resident Assistant Medical Officer. Salary £300 per annum, &c.

WINCHESTER, ROYAL HAMPSHIRE COUNTY HOSPITAL.—Resident Medical Officer. Salary as arranged, with board, &c.

## Births, Marriages, and Deaths.

## BIRTHS.

ASH.—On Feb. 21st, at The Lodge, Brampton grove, Hendon, to the wife of Dr. Edwin Ash (of Harley-street, W.)—a son.

KENNEDY.—On Feb. 18th, in London, the wife of Captain Charles M. Kennedy, R.A.M.C., of a son.

MURRAY.—On Feb. 25th, at 95, Cadogan-gardens, W., the wife of W. Murray, M.B., D.P.H., of a son.

## MARRIAGES.

LAMBERT—LOCKHART.—On Feb. 22nd, at St. Martin's by Looe, Cornwall, by the Rev. W. S. Picken, M.A., Surgeon John Lambert, M.D., R.N., eldest son of the late John Lambert, of Cambridge, to Alice Margaret, fifth daughter of the late James Lockhart, The Elms, Kirkcaldy.

MAYBERRY—HESLOP.—On Feb. 20th, at St. Mary's Church, St. Ives, Cornwall, George Mahony Mayberry, Temporary Captain, R.A.M.C., to Lily, eldest daughter of the late William Heslop.

## DEATHS.

FORSTER.—On Feb. 11th, of heart failure following influenza, while in charge of a hospital at Zaleszczyki, Galicia, Dr. Laura Forster.

MCKELLAR.—On Feb. 20th, at 10, Crondace-road, Fulham, Peter Hugh Montgomery McKellar, M.A., M.B., O.M. Glasg., aged 72.

TUKE.—On Feb. 23rd, at Chiswick House, Chiswick, W., from pneumonia after a short illness, Thomas Seymour Tuke, M.A., M.B.Oxon., aged 61.

WEBER.—On Nov. 20th, at Georgetown, British Guiana, Hubert Clinton Weber, M.D. Edin., aged 34.

WILLIAMSON.—On Feb. 21st, at Durley, Camberley, Deputy Surgeon-General Benjamin Williamson, I.M.S., retired, aged 83 years.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

## Notes, Short Comments, and Answers to Correspondents.

### PUBLIC HEALTH IN BRITISH GUIANA.

A REPORT prepared by Mr. E. W. Ball Greene, Acting Assistant Secretary, on the affairs of British Guiana for the year 1915, has been presented to Parliament. From it we gather that the Registrar-General's estimate of the population of the colony on Dec. 31st, 1915, was 312,391 (162,403 males and 149,988 females). The general birth-rate for 1915 was 31·3 per 1000 of the estimated population, that of each of the several races representing the community being as follows: Portuguese, 20·5; Europeans other than Portuguese, 12·9; East Indians, 32·6; Chinese, 30·6; Blacks, 29·5; Mixed Races, 33·9. Of the births registered 44·5 percent were legitimate and 55·5 percent illegitimate. The general death-rate was 27·7 per 1000, that of the various races being: Portuguese, 28·0; Europeans other than Portuguese, 11·6; East Indians, 28·8; Chinese, 25·9; Blacks, 28·4; Mixed Races, 20·5. The six principal causes of death throughout the colony during the past five years are given as follows: Bowel complaints (including dysentery, diarrhoea, and enteritis), 15·4 per cent. of the general mortality; fevers (malaria and others), 14·6; pneumonia and bronchitis, 11·4; kidney diseases, 8·8; diseases of early infancy (including premature birth, infantile debility, &c.), 8·0; and phthisis and other forms of tuberculosis, 5·7 per cent. Enteric fever is a notifiable disease; during 1915, 419 cases were notified with 75 deaths. Anti-malaria and anti-mosquito measures are being generally and gradually enforced with visible signs of success. The number of screened vats in the city of Georgetown has increased as a result of the screening regulations being enforced. In 1906-7 33,748 cases of malarial fever were treated in the sugar estates' hospitals; in 1915 the numbers had fallen to 11,788. Quinine has been for some years sold at all post-offices to the general public at cost price. It is also distributed by the sugar estates free to their labourers, and by the Government to prisoners, members of the police force, and inmates and attendants at the public institutions. Ankylostomiasis, which has engaged the attention of the medical department for several years, has considerably decreased on the sugar estates; this is attributed to improved sanitary measures and the erection of latrines.

There are five public hospitals in the principal centres of population, and the outlying districts are served by dispensary hospitals and dispensaries. The immigration law also requires the maintenance of hospitals on every plantation on which there are indentured East Indian labourers, and these institutions are available for the treatment of emergency and pauper cases from the general community. There were 434 patients in the public hospitals at the beginning of the year and 11,304 were admitted during the year; there were 1399 deaths. In addition to those admitted to hospital, out-door treatment was given to 37,574 persons. The daily average of inmates in the lunatic asylum was 775; 75 were discharged cured during the year and 74 died. At the leper asylum there were 381 patients when the year began (265 males and 116 females) and during the year 44 were admitted.

### POTATOES.

THERE have been several references lately in the newspapers to forcing the growth of potatoes, and the suggestion has been made of placing the seed potatoes in shallow boxes in a warm place before planting out. This suggestion, though apparently novel, is at least 20 years old, as the Rhode Island Agricultural Station in the United States then published a bulletin giving the results of experiments made by planting potatoes in pots in a greenhouse and transplanting them out of doors. Another method was to expose small potatoes as large as hen's eggs to heat and light for six weeks, to develop a strong bud and roots before planting them. Both plans gave a better yield, especially the last, which resulted in a gain of 32 bushels per acre. The acreage under potatoes in the United States has steadily grown. The figures nine years ago had reached 3,257,000 acres, producing 278,935,000 bushels, or an average of 85·7 bushels per acre, with a farm value of 197,039,000 dollars; an average price of cents 70·6 per bushel. 52 bushels equal 189 dekalitres. The main crop goes under the name of "Irish potatoes," but there is also a crop of 60 million bushels of "sweet potatoes." This is the esculent root of the *Ipomoea batatas*, or *Batatas edulis* or *Convolvulus batatas* much eaten in the United States. In Peru it is called *camote*; in Cuba *boniato*; in Spain *batata de Malaga*; in other countries Spanish or Indian potatoes. It is the spindle-shaped tuber of a species of convolvulus, and is said to have been used for food

before the common potato was eaten. It contains 16 per cent. of starch and 10 per cent. of sugar. This is the "potato" referred to by early writers, and Shakespeare in *Troilus and Cressida* refers to the "potato finger," meaning a long thick finger. Sweet potatoes require a warm climate. In England they were introduced from Spain and the Canaries, but potato-growing was not encouraged in England in the Stuart times, and even so late as early Victorian days some political economists thought the "potato rot" might be a blessing if it taught the working classes not to rely upon potatoes but to seek better food. In contrast to this our Royal Society in 1663 took some measures for encouraging the cultivation of potatoes with the view of prevention of famine.

### VITAL STATISTICS OF BERMUDA.

Lieutenant-General Sir G. M. Bullock, K.C.B., Governor of Bermuda, has forwarded to the Colonial Office a report on the Blue book for 1915, from which it appears that at the end of the year the estimated total civilian population was 20,801, composed of 7219 whites and 13,582 coloured. The birth-rate for the year was 22·16 per 1000 among white residents and 35·59 among coloured residents. The death-rate was 13·85 per 1000 among white resident civilians and 18·18 among the coloured. The mortality among children under 5 years of age was 31·2 per cent. (10·27 whites and 39·67 coloured) of the total deaths. The deaths from cancer numbered 18 and those due to tuberculosis 33. No outbreak of serious infectious disease occurred during the year. The mean temperature of the air for the year was 69·8° F. and the total rainfall 61·8 inches. There is no hospital maintained by the Colonial Government, but the King Edward VII. Memorial Hospital is expected to be ready for occupation early in 1917. There is a cottage hospital near the city of Hamilton which is supported by voluntary contributions, and hospitals are also maintained in connexion with the Imperial naval and military establishments. The number of visitors to the colony in 1915 was only 10,831, as compared with 14,773 in 1914 and 21,595 in 1913, the decrease being attributed to the dislocation of the steamship service with New York owing to the war.

## Medical Diary for the ensuing Week.

### SOCIETIES.

#### ROYAL SOCIETY, Burlington House, London, W.

THURSDAY.—Papers:—Mr. W. B. Bottomley: Some Effects of Growth-promoting Substances (Auximones) on the Growth of Lemma minor in Culture Solutions (communicated by Prof. F. W. Oliver).—Florence A. Mockeridge: Some Effects of Growth-promoting Substances (Auximones) on the Soil Organisms concerned in the Nitrogen Cycle (communicated by Prof. F. W. Oliver).

#### ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W. MEETINGS OF SECTIONS.

Thursday, March 8th.

#### BALNEOLOGY AND CLIMATOLOGY (Hon. Secretaries—Chas. W. Buckley, J. Campbell McClure): at 5.30 P.M.

Demonstration  
Of Mensuration Apparatus in use at the Red Cross Clinic for the Physical Treatment of Officers, 126, Great Portland-street, W. (with cases).

Paper:  
Mr. J. Roldie: Manipulation Bath. (Communicated by Dr. J. Campbell McClure.)

#### LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

#### ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.

MONDAY.—5 P.M., Hunterian Lecture:—Major A. B. Webb-Johnson, R.A.M.C.: The Surgical Complications of Typhoid and Paratyphoid Fevers.

#### ROYAL COLLEGE OF PHYSICIANS, EDINBURGH, Hall of the College, Nine Quay-en-street.

MONDAY.—5 P.M., Morison Lectures:—Dr. E. Bramwell: Neurology of the War—Gunshot Wounds of the Peripheral Nerves. (Lecture I.)

FRIDAY.—5 P.M., Morison Lectures:—Dr. E. Bramwell: Neurology of the War—Shell Shock and the Effects of Head Injuries. (Lecture II.)

#### POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Parrot: Operations.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

**FRIDAY.**—10 A.M., Dr. Simson: Gynaecological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

**SATURDAY.**—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

**NORTH-EAST LONDON POST-GRADUATE COLLEGE,** Prince of Wales's General Hospital, Tottenham, N.

**MONDAY.**—Clinics:—10.30 A.M., Surgical Out-patients (Mr. H. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham); Gynaecological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leesle).

**TUESDAY.**—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting).

**WEDNESDAY.**—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. E. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M., Eye Operations (Mr. R. F. Brooks).

**THURSDAY.**—2.30 P.M., Gynaecological Operations (Dr. A. B. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leesle).

**FRIDAY.**—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. H. Gillespie); Eye Out-patients (Mr. E. P. Brooks).

**THE THROAT HOSPITAL,** Golden-square, W.

**MONDAY.**—5.15 P.M., Special Demonstration of Selected Cases.

**THURSDAY.**—5.15 P.M., Clinical Lecture.

**ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN,** 49, Leicester-square, W.C.

**TUESDAY**—6 P.M., Dr. K. Stille: Ionisation. Electrolysis.

**WEDNESDAY**—5 P.M., Dr. W. Griffith: The Pathology of Diseases of the Skin.

**ROYAL INSTITUTE OF PUBLIC HEALTH,** Lecture Hall of the Institute, 37, Russell-square, W.C.

Course of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—

**WEDNESDAY.**—4 P.M., Lecture VIII.:—Prof. F. G. Hopkins: The Selection and Preparation of Foods in War Time. Prof. D. N. Paton, Prof. W. H. Thompson, Dr. M. S. Pembrey, Dr. A. W. J. MacFadieen, and Dr. W. J. Howarth have promised to take part in the discussion.

**ROYAL INSTITUTION OF GREAT BRITAIN,** Albemarle-street, Piccadilly, W.

**MONDAY.**—5 P.M., General Meeting.

**THURSDAY.**—3 P.M., Prof. A. Denny: Sponges: a Study in Evolutionary Biology. (Lecture I.)

**FRIDAY.**—5.30 P.M., Sir Almroth Wright, C.B.: The Treatment of Wounds in War.

#### METEOROLOGICAL READINGS. (Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Feb. 28th, 1917.

Date.	Rain-fall.	Solar Radio in Vesno.	Maxi- mum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
Feb. 22	...	46	41	39	39	39	Overcast
" 23	...	56	45	39	38	39	Fine
" 24	0.10	52	46	39	43	43	Fine
" 25		57	47	42	42	42	Overcast
" 26	0.01	73	49	36	37	38	Fine
" 27	...	64	49	36	37	37	Overcast
" 28	...	60	47	37	39	42	Overcast

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

#### EDITORIAL NOTICES.

It is most important that communications relating to the Editorial business of THE LANCET should be addressed exclusively "To THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET should be addressed "To the Manager."

We cannot undertake to return MSS. not used.

Office: 423, STRAND, LONDON, W.C.

#### MANAGER'S NOTICES.

##### VOLUMES AND CASES.

VOLUMES for the second half of the year 1916 are now ready. Bound in cloth, gilt lettered, price 16s., carriage extra.

Cases for binding the half-year's numbers (inland edition) are also ready. Cloth, gilt lettered, price 2s., by post 2s. 4d. To be obtained on application to the Manager, accompanied by remittance.

##### ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the new year, the price was raised to 8d. The rates of subscription remain as revised in October.

##### TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C., are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and not to THE LANCET Offices.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

THE COLONIAL AND FOREIGN EDITION is published in time to catch the weekly Friday mails to all parts of the world.

##### TO COLONIAL AND FOREIGN SUBSCRIBERS.

Subscribers abroad are particularly requested to note the rates of subscriptions given on page 6.

The Manager will be pleased to forward copies direct from the Offices to places abroad at the rates shown, whatever be the weight of any of the copies so supplied.

#### BOOKS, ETC., RECEIVED.

ALLEN, GEORGE, AND UNWIN.

Via Paris: How Terms of Peace can be Automatically Prepared while War is still Going On. By H. F. McCormick. 1s. net.

AMERICAN LARYNGOLOGICAL ASSOCIATION, 44, West 49th Street, New York City.

Transactions, May 9th, 10th, and 11th, 1916.

APPLETON, D., London and New York.

Text book of Histology. By H. E. Jordan, A.M., Ph.D., and J. S. Ferguson, M.Sc., M.D. 15s. net.

BAILLYER, TINDALL, AND COX, London.

Organs of Internal Secretion: Their Diseases and Therapeutic Application. A Book for General Practitioners. By Ivo Geikie Cobb, M.D., M.R.C.S. 5s. net.

BALE, JOHN, SONS, AND DANIELSSON, London.

Hints for Hospital Orderlies. By N. Corbet Fletcher, M.B., M.R.C.S. 6d. net.

BELL, G., AND SONS, London.

General Chemistry for Colleges. By Alexander Smith. Second edition, entirely rewritten. 6s. 6d. net.

P. BLAKISTON'S SONS, Philadelphia.

Diseases of Occupation and Vocational Hygiene. Edited by G. M. Kober, M.D., LL.D., Washington, and W. C. Hanson, M.D., Belmont. \$8.

CHURCHILL, J. AND A., London.

Sanitation in War. By Major P. S. Leigan, C.B., R.A.M.C. With Introduction by Surgeon-General Sir Alfred Keogh, K.C.B. Second edition. 6s. net.

Year Book of Pharmacy. Edited by J. O. Braithwaite and Others.

Text-book of Meat Hygiene. By R. Edelmann, Ph.D. Third English edition. By J. R. Mohler, A.M., V.M.D., and Adolph Elekborn, D.V.S. 21s. net.

Transactions of the Ophthalmological Society of the United Kingdom. Vol. XXXVI. Session, 1916. 12s. 6d. net.

CONSTABLE AND CO., London.

Herbert Spencer. By Hugh Elliot. Makers of the Nineteenth Century Series. 6s. net.

GRIFFIN, CHARLES, AND CO., London.

Practical Sanitation: A Handbook for Sanitary Inspectors and Others. By George Reid, M.D., D.P.H. Eighteenth edition. 6s. net.

HEINEMANN, WILLIAM, London.

Cerebellar Abscess: Its Etiology, Pathology, and Diagnosis, including Autopsy and Physiology of the Cerebellum. By Isidore Friesner, M.D., and Alfred Brown. 12s. 6d. net.

KIMPTON, HENRY, London.

Text-Book of Practical Therapeutics. By Hobart Amory Hare, M.D., B.Sc. Seventeenth edition, enlarged and rewritten. 25s. net.

LAURIE, T. WEINER, London.

Story of the Geisha Girl. By T. Fujimoto. 7s. 6d. net.

LEWIS, H. K., London.

Clinical Bacteriology and Haematology for Practitioners. By W. D'Este Emery, M.D., B.Sc. Lond. Fifth edition. 9s. net.

Glaucoma: A Handbook for General Practitioners. By R. H. Elliot, M.D., B.S. Lond., Sc.D. Edin., F.R.C.S. Eng., Lieutenant Colonel, I.M.S. (retired). 3s. 6d. net.

LIPPINCOTT, J. B., Co., London and Philadelphia.

International Clinics. Edited by H. R. M. Lanlis, M.D., and Others. Vol. IV. Twenty-sixth series, 1916. £s. per 4 vols.

- LONGMANS, GREEN, AND CO., London.** Essentials of Physiology. By F. A. Bainbridge, M.D. Cantab., and J. Acworth Menzies, M.D. Edin. Second edition. 2s. 6d. net.  
**X RAYS.** By W. C. Kaye Captain, R.E. (T.), Head of the Radium and X Ray Department at the National Physical Laboratory. Second edition. 9s. net.  
**MUSSON Book Co., Toronto.** With a Field Ambulance at Ypres. By William Boyd. \$1.00 net.  
**PUTNAM (G. P.) SONS, London and New York.** Hygiene and Morality: A Manual for Nurses and Others, giving an Outline of the Medical, Social, and Legal Aspects of Venereal Diseases. By Lavinia L. Dook, R.N.  
**ROUTLEDGE, GEORGE, AND SONS, London.** Photography in Colours. By George Lindsay Johnson, M.A., M.D., B.S., F.R.C.S. 4s. 6d. net.  
**SMITH, ELDER, AND CO., London.** An Index of Symptoms, with Diagnostic Methods. By R. W. Leftwich, M.D. Sixth edition. Price 10s. 6d. net.  
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Hunterian Lectures

ON THE

INDIAN OPERATION OF COUCHING  
FOR CATARACT.

Delivered before the Royal College of Surgeons of England  
on Feb. 19th and 21st, 1917,

By R. H. ELLIOT, M.D. LOND., F.R.C.S. ENG.,  
LIEUTENANT-COLONEL, INDIAN MEDICAL SERVICE.

(Concluded from p. 330.)

THE CHAMBERS OF THE EYE.

The Anterior Chamber.

THIS chamber showed departures from the normal in different directions. These will be dealt with under separate headings.

1. Scantiness of contents.—One chamber was quite empty, due to the presence of a corneal fistula. (*Vide Fig. 14.*) In a number of cases the chamber was greatly shallowed, owing to the encroachment of the vitreous body upon it. In these the filtering angle was sealed by adhesion over a wide area. In a few cases *l'iris bombe* was responsible for the shallowing of the chamber. (*Fig. 22.*) In yet others a severe plastic inflammation had involved the structures, lying in and posterior to the aqueous chamber, and had matted them to the posterior surface of the cornea, thus almost obliterating the cavity. This union had been so strong that in the process of hardening the membrane of Descemet remained adherent to the organised exudate beneath it, and a spurious chamber was thus formed lying in the substance of the cornea.

2. Hypopyon was present in 6 specimens, and in 1 the pus was mixed with blood. The length of histories in these cases varied from a matter of months up to 20 years.

3. Hyphema—Blood was present in the anterior chamber in 9 specimens. In some of them it was fresh, whilst in others it was altered and decolourised. The long histories given by a number of these cases suggest either that there had been some recent cause for hemorrhage, or else that a leakage of blood had been constantly occurring. In 2 of the eyes the iris had been torn; in every one of the others there was evidence that severe iritis had been present.

4. Vitreous in the anterior chamber.—In 4 eyeballs the aqueous and vitreous cavities appear to have been in free communication with each other, and filaments of the vitreous body can be traced into the anterior chamber. In 2 of these the angle was widely open, and in the other 2 it was closed by irido-corneal adhesions.

5. Lens matter in the chamber (*Vide Figs. 3, 4, and 5.*).—In four eyes lens matter was found in the anterior chamber. In one the history showed that a nucleus had passed freely backwards and forwards between the two chambers. In another a Morgagnian cataract was wedged in the angle of the chamber, but had contracted no adhesions; in the remaining two the nuclear masses were firmly fixed in position by an abundant quantity of exudate.

6. Albuminous exudates in the anterior chamber.—These were found in three cases; few or no structural elements were present; during life the contents of the chamber were fluid, but they had coagulated under the influence of the formalin preparation of the specimens; they were probably derived from the iris and ciliary body.

The Vitreous Chamber.

In the great majority of the eyeballs under examination it was observed that the vitreous body had become detached and shrunken, and that its remnants showed distinct signs of infiltration and often of organisation. The appearances observed in the various cases fall naturally under a number of headings. 1. Very slight evidence of vitreous structure is discernible. (*Vide Fig. 6.*) 2. Filmy masses are present in the chamber. (*Vide Fig. 7.*) These either (a) are confined to the anterior portion of the chamber, or (b) take the form of a cone with its apex at the nerve head, and its base in the neighbourhood of the ora serrata and ciliary body. 3. Masses are present which give the impression of being freely

NO. 4880.

infiltrated with inflammatory material (*vide Fig. 8*); either throughout their substance or in isolated foci; these may be divided into the same subgroups, (a) and (b), as those under the previous heading. 4. A distinct fibrous organisation is noticeable in the conical masses, which represent the detached and shrunken vitreous. (*Vide Fig. 9.*) 5. No detail is discernible (*vide Fig. 11*) owing to the fact that the retina has become detached and inextricably matted with the one-time vitreous contents, and with the iris and ciliary body.

There are certain preliminary points which we must first settle. 1. There is no essential difference between the cases in which there is a definite cone of filmy or infiltrated membrane reaching from the optic nerve head to the ciliary body, and those in which deposits of a similar nature are found confined to the anterior portion of the vitreous chamber. The grounds for this statement are as follows:

(a) An examination of the more complete specimens of conical exudate shows that the membrane becomes very slender as the nerve head is approached, and it is obvious that very little violence would be required to break this delicate thread across, and so to allow the whole membrane to be gathered up by its own elasticity towards its large and strong anterior attachments. (b) There is strong evidence in a number of the specimens of this series to show that the contraction of the shrinking inflammatory material within the globes takes place with such force as might easily suffice to break across the slender nerve attachment of some of these cones. (c) It is obvious that in not a few cases the tapering apex of a conical exudate is likely to be cut across during section of the globe or broken across during subsequent manipulations. (d) Specimens, in which the exudates presented a definite conical shape, when they were first cut in India, have arrived in this country transformed during the voyage into the similitude of those, in which this exudate is loosely gathered into the fore part of the vitreous chamber; the apex of the cone had been broken off at the nerve head, and the exudate had moved forward by virtue of its own elasticity toward the anterior attachments of the mass. Taking all these points into consideration, we may conclude that in all the eyeballs which present the appearance of shrunken vitreous the structure was originally conical in form and that departures from that shape are merely artefacts. Stress is laid on this point, because in a number of the globes the appearances present suggest that the exudate is poured out from the ciliary body and is confined to the neighbourhood of that structure. We believe such interpretation to be quite erroneous and to be founded on the observation of artefacts.

2. Is this appearance of a shrunken vitreous body definitely pathological? The answer is in the affirmative, for the following reasons: (a) All these globes were treated alike, being dropped into 5 per cent. formalin solution on removal and kept there till frozen and cut. (b) Normal eyeballs treated in this way present no such evidence of definite vitreous structure. (c) Every grade can be traced in the series before us, between the appearance of delicate filmy membranes in the vitreous, and the presence of firmly organised structures. (d) Though it is very difficult to examine these exudates satisfactorily under the microscope, there are a large number of specimens which definitely show evidence of an inflammatory exudation, strengthening and thickening the vitreous body. In not a few of these the anterior hyaloid membrane (the term is used in a non-committal sense) is definitely thickened and infiltrated with inflammatory material. (*Vide Fig. 12.*) The conclusion arrived at is that these widely varying evidences of structural alteration in the vitreous body, are to be interpreted as due to the penetration of the hyaloid by-inflammatory material of chemotoxic origin, and to the subsequent organisation of that infiltration. (e) There still remains the clinical evidence. The lecturer was increasingly reluctant, as his Indian experience accumulated, to remove lenses which had been couched. It was not that vitreous escaped, but that the results of operation were usually poor, and that the blame of the lost sight was then apt to be most unfairly ascribed to the extraction operation. In view of the frequent occurrence of vitreous changes this failure to help the patients is easily explained. Major Kirkpatrick has taken a different, and possibly a more generous, view of the situation, and has removed a number of these couched lenses; his evidence is of extreme interest in the light of our recent pathological findings; he has been "struck by the rarity of vitreous

escape even after a fairly extensive investigation with a "spoon" in extracting a couched lens. He adds:

"I have noticed that the vitreous body becomes shrunken and extraordinarily tough, so much so that when an eye is excised (either for glaucoma or for irido-cyclitis following Mahomedan operation) the whole globe can be held up by a strabismus hook transfixing the vitreous, though the latter appears perfectly clear. The vitreous undoubtedly does undergo shrinkage, and leaves a large space, which is occupied by aqueous."

Straub<sup>1</sup> has described some experiments which he made on animals, in the course of which he injected pathogenic organisms either into the vitreous or into the ciliary body; the result varied according to the part infected, and the poisoned area attracted leucocytes by chemotaxis to itself. Particular interest attaches to the following of his findings: (1) The optic nerve head was swollen and filled up with leucocytes; (2) there was evidence "that the lymph current of the vitreous goes by the optic nerve and that chemotactic substances are brought by this current from the granuloma (the artificial infection) to the nerve"; (3) the leucocytes found in the vitreous showed the way from the granuloma to the cup of the optic nerve—they were seated on thin membranes and most of them were heaped together in small dots; (4) aggregations were found on the walls of the cavities of the eye (on the cornea, on the retina, on the lens capsule, &c.), attracted there, in Straub's opinion, by a chemotactic action.

In the experiments above considered, which were very limited in number, an effort was made to localise the infection to one or other part of the eye and to work with a virus (tubercle bacilli) which was comparatively constant in its toxicity.

What Straub did with a few eyes has been done in the series now before us by the Indian coucher in 54. The interest of the experiments is heightened by the fact that whereas in the Dutch experiments the toxicity of the virus was kept as constant as possible, in the Indian ones it varied from that of organisms which took many years to destroy the sight to that of those which at once produced a fulminating panophthalmitis. One point more—the Indian operator made no effort to confine his procedure (and with that procedure went infection) to any one structure; sometimes he attacked the lens from in front, and in doing so he often primarily injured the iris but may have spared the vitreous chamber; sometimes he entered through the ciliary body or through the choroid, opening up the hyaloid cavity in doing so. His want of skill and the slenderness of his anatomical knowledge made him catholic in the damage he inflicted, but running through his work is the trail of septic infection of the eyeball by penetrating wounds. The result is that he has provided us with a large material of extraordinary interest in the study of the problem which Straub started on.

*The filmy masses in the vitreous chamber.*—As has already been stated, the contents of the vitreous chamber in these specimens vary from thin gauzy films, which can only be detected by careful search, up to thick masses which strike the eye as soon as the specimen is looked at.

It is not easy to obtain a view of these exudates in section, but nevertheless they appear in a considerable number of the microscopic specimens and their character is always the same; they consist of a more or less structureless mass with blood cells and leucocytes embedded in its substance. In fact, they would seem to be identical with the membrane spoken of by Straub as harbouring the leucocytes which give rise to dust-like and other opacities of the vitreous in his experimental cases. At a later stage, or perhaps in cases where the inflammation has been of a more plastic character, a distinct fibrillation of the exudate can be seen, and there may even be evidence of a definite fibrous tissue formation. If we confine our attention for the moment to the eyeballs in which the exuded mass is devoid of structure in the anterior portion of the cone we shall find that, on tracing it back toward the apex by which it is attached to the optic nerve, it becomes more highly organised and more richly cellular, whilst fibrillation and fibrous tissue formation make their appearance. The same thing, though in a lesser degree, may be observed in the neighbourhood of the ciliary body, doubtless due to the presence of a plastic exudate derived from that structure.

An examination of the optic nerve and of the exudate attached to it reveals the following features: 1. The nerve head is congested and its vessels stand out in prominent

relief. 2. There is a considerable effusion of leucocytes in the neighbourhood of these vessels. 3. A mass of exudate fills up and projects from the optic nerve cup, whether this latter is physiological or glaucomatous. This mass is clearly contracting, and thereby pulling on the tissue which lines the edges of the cup. 4. Along the centre of the projecting exudate are to be seen (a) an abundance of mono-nuclear cells; (b) the commencement of a fibrous tissue formation; and (c) a new formation of blood-vessels.

The appearances above enumerated would indicate that we have to do with an inflammation of the optic nerve, which had been induced by chemotactic substances brought thither along Stilling's canal. Such an idea is not a new one. It was suggested by Straub in order to explain the optic neuritis he found in his two cases of experimental inoculations of the ciliary body, and it also enjoys provisionally the support of Fuchs's<sup>2</sup> authority. The idea that part of the lymph of the eye passes backward along a passage corresponding to the central hyaloid canal is not generally accepted, and rests largely on inference from the observation of pathological specimens. It would be difficult, however, for anyone who has carefully studied this series to doubt that such a flow exists; it is, of course, not suggested that any large percentage of the lymph travels in this direction.

A confirmation of these views is obtained if we refer to the three eyeballs in which the organisation of the cone of exudate into the vitreous has attained the highest development. We notice in these how extremely far this process of organisation has been carried in the apex of the cone, where it is represented as a well-defined opaque cord. (Fig. 23, No. 199, *vide* also Fig. 9.) In one of the three a fibrous band, presumably the remains of the canal of Stilling, is clearly seen, whilst in the two others the existence of this structure is at least indicated. It is possible that in the first named a congenital peculiarity exaggerated the distinctness of the appearance.

#### THE RETINA.

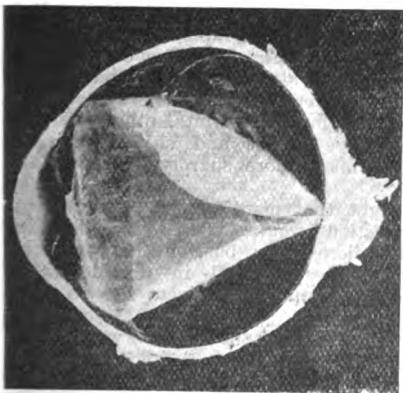
Detachment of the retina occurred in 38 of the 54 globes (70.38 per cent.) and was absent in 16 (29.62 per cent.). It was partial and ill-marked in 5 (9.25 per cent.), extensive in 9 (16.68 per cent.), and complete in 24 (44.44 per cent.). The ocular tension was above normal in 11 out of the 16, which presented no detachment, but in only 6 out of the remaining 38; it was below the normal in 13 of the 24 globes with complete detachment, and above it in 3 of them. In the very great majority of the eyes the detachment of the retina was undoubtedly due to traction from within. The sequence of events is plain from a study of the whole series.

At the operation there was an infection of the coats of the eye and also of the vitreous chamber from without; this led to the formation of inflammatory material within the vitreous chamber; adhesions took place between these new-formed membranes and the retina; finally the shrinkage of the organising inflammatory material tore the retina from its bed. Every step of the process can be traced either in microscopic sections or in the naked-eye specimens. The earliest possible stage is seen under the microscope in sections of an eyeball (No. 37), where in the neighbourhood of the ora serrata the shrinkage of the exudate within the vitreous chamber has just begun to lift the retina from its bed. The individual points of attachment between the inflammatory membrane and the retina are beautifully illustrated. The ultimate stage of the process is to be found in those cases in which the retina is not merely totally detached but has shrunk posteriorly into a stick-like form (*vide* Fig. 16), whilst it opens out anteriorly into a mass, in which the iris, the ciliary body, the lens, the remains of the vitreous, and the retina are inextricably matted and tangled. When sections of such specimens are examined under the microscope their leading feature is the evidence of severe plastic irido-cyclitis, with the formation of abundant cicatricial tissue, which mats all the parts together and severely distorts the normal anatomical arrangement. The retina is dragged forward from the neighbourhood of the ora serrata over the ciliary body, whilst elsewhere it is thrown into abundant folds and completely separated from its normal attachments. A pseudo-cystic condition is thus produced, the apparent cysts being formed by the elaborate folding of the membrane. (*Vide* Figs. 11 and 21.) These may be small and slit-like, or may be large and round, so simulating the appearance of true cysts. In front of the retinal mass lens fragments and capsule are seen in a number of the specimens entangled in

<sup>1</sup> The Pathology of Dust-like Bodies in the Vitreous, &c., Trans. of the Ophthalmological Society of the United Kingdom, 1912, xxxii., 60.

<sup>2</sup> Fuchs: Textbook of Ophthalmology, Duane, fourth edition, 1911, p. 16.

FIG. 22.

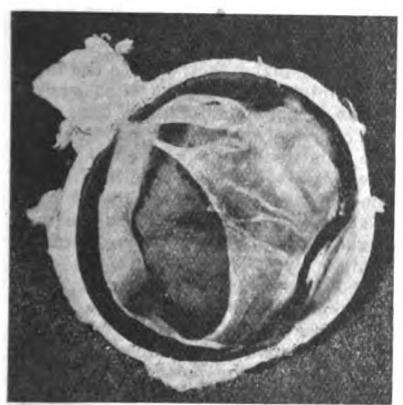


Upper half, left eye. (111.)

type of inflammation and the more intense the process is, the greater will be the measure of ultimate cicatrization, always provided that the inflammation is not intense enough to result in suppuration.

There are several different ways in which the exudate which forms within the vitreous chamber may be placed in a favourable position for the production of retinal detachment.

FIG. 23.



Right eye, lower half. (199.)

its walls, and thus paved the way for the separation of the membrane. In one of these cases (No. 44) a longitudinal fold was detached, whilst in the other (No. 72) the detachment was broad and shallow.

2. In the second method also it is necessary to postulate an infection of the retina before that membrane could have contracted adhesions, either localised or widespread, to the neighbouring vitreous exudate.

Once, however, the virus was planted within the hyaloid chamber, it probably diffused itself widely, and by means of chemotaxis set up an inflammation of the retina; evidences of such a retinitis abound in many of the specimens. Attachments

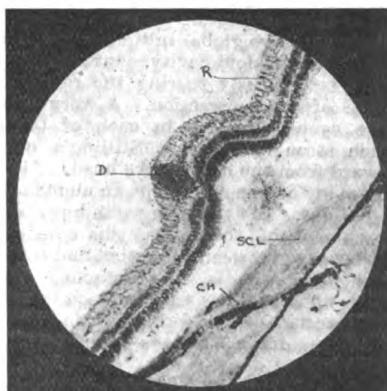
the scar tissue. As has already been said, all grades can be traced from the slightest detachments up to those we have just been describing. The greater or less degree of separation of the retina met with in the different globes is doubtless in part a question of time, but it is also, and probably to a much larger extent, one of the character and grade of the inflammatory process excited in the eyeball. The more plastic the

between the vitreous exudate and the retina having been thus formed, the contraction of the former would naturally lead to the separation of the latter from its choroidal bed.

3. In a few of the globes the contracting membrane is merely an infiltration and thickening of the anterior layer of the hyaloid. It is well known that the vitreous body is, under normal conditions, more firmly attached to the retina in the neighbourhood of the ora serrata than it is elsewhere; it is therefore obvious that an inflammatory contracting membrane in the anterior part of the vitreous will pull throughout its whole circumference on the retina in its neighbourhood, effecting a detachment over a very wide area. (*Vide Fig. 12.*) This is just what we see happening in the globes we are now discussing.

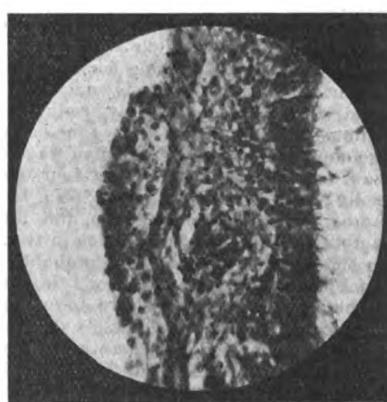
4. In a number of the specimens it can be clearly seen that the bands, which drag upon the retina, radiate from the remains of lens masses, which are themselves encased in inflammatory tissue, and are bound thereby to the iris and ciliary body in their neighbourhood. Such bands appear in some cases to lie in the substance of the retina itself (*vide Fig. 15.*); in others they are situated in the vitreous and present the form of membranous sheets, separated from the subjacent retina only by narrow spaces, and finding attachment to it in the neighbourhood of the equator. (Nos. 117 and 170.) The characteristic of these cases would appear to be that the dislocated lens is in them the principal focus of sepsis within the eye. The point is of interest since some of them, at least, represent ruptured Morgagnian cataracts, for the lecturer has reason to believe, on clinical

FIG. 25.



Proliferative dot in retina. R, retina; SCL, sclera; CH, choroid; D, mass of leucocytes surrounding vessel wall. (175.)

FIG. 26.



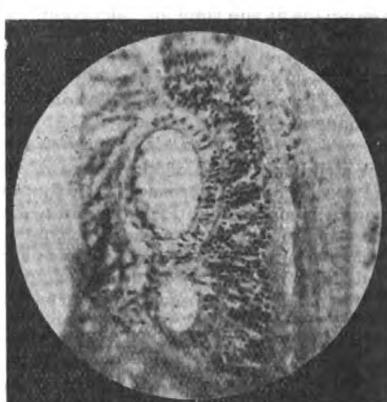
Collection of leucocytes on inner surface of retina. (37.)

FIG. 24.



Left eye, lower half. (240.)

FIG. 27.



Cysts in retina. (111.)

grounds, that the liberation of Morgagnian fluid within the eye is sometimes, at least, productive of considerable irritation to the surrounding parts.

There are two globes in the collection in which the exudate within the hyaloid cavity, converted into organised fibrous tissue, is obviously tearing the retina from its bed in the course of its contraction. A very interesting feature of these eyeballs is that in each of them an opaque band which strongly suggests Stilling's canal can be traced forward from the optic nerve head. (*Vide Fig. 23*)

In many of the specimens an abundant subretinal exudate is present. In the long-standing ones, with complete detachment of the retina, this effusion fills up the whole of the space between the retina and the choroid. When the latter membrane is also detached a further exudate of similar appearance is seen between it and the sclera. Owing to the action of the formalin, the very firm coagulation of the long-standing effusions gives the eyes a solid and very characteristic appearance (*viz.* Fig. 11); the half globes look like sections of marbles made of fused and clouded glass. In earlier cases the effused mass is much less firm, but is whiter and more opaque, with a tendency to present a flocculent appearance. The question that naturally presents itself is, whether these effusions were the cause or the result of the retinal detachment. The presence of the inflammatory exudate within the vitreous, with which we have already dealt, provides such a satisfactory explanation of the detachments of the retina throughout this series, that it seems unlikely that the effusions in question, whether subretinal or subchoroidal, play any causative part whatever.

We must place in quite a different category the cases, four in number, in which the effused fluid consisted of blood. The source of the haemorrhage in these cases is different from that which is met with when the pressure within an eye is suddenly reduced by the operative opening of the globe. In the latter case it is the large choroidal vessels which give way and the haemorrhage is subchoroidal, whereas, in the four cases under review the bleeding was subretinal in one (N. 157), into the vitreous chamber alone in one (Fig. 24), and into both the vitreous chamber and the subretinal space in two. The haemorrhage into the vitreous chamber was probably due to injury to the retinal vessels by the couch's instrument, though it is possible that blood may have found its way through the retinal cut from choroidal vessels divided at the time. The subretinal haemorrhage probably escaped from the severed branches of the smaller choroidal vessels. The fact that in no case was a large subchoroidal haemorrhage present would indicate that the large choroidal vessels were tough enough to escape injury, being probably pushed aside by the comparatively blunt instrument the couch used. In one eyeball (N. 157) large cholesterol crystals were seen shining on the cut surface of the sanguineous mass. A similar phenomenon was observed in the case of one of the albuminous effusions above spoken of.

It remains to deal with a rare cause of detachment of the retina or of the retina and choroid—viz., the application of direct violence at the time of operation. This is best exemplified in the two globes, in which the cataract was thrust through and behind the retina, by the couch's instrument at the time of operation. (*Vide Fig. 13*.) It is also beautifully illustrated by specimen No. 72 in which the retina and choroid were carried in front of the couch's instrument before the latter succeeded in perforating them. (*Vide Fig. 20*.) The dislocation thus produced proved permanent.

#### Dots on the Retina.

A striking feature of the series of specimens before us is the presence of numerous dots on the retina. These are to be seen in 16 cases, and doubtfully in a seventeenth. In at least one other similar dots are present on the choroid and on the posterior surface of the iris. (*Vide Fig. 18*.) We therefore find this peculiar appearance in one case in every three; but this is far from representing what is probably its real relative frequency, for in 24 of the globes the retina was totally detached, and it was therefore impossible to say whether there were dots present on it or not. If we put these 24 to one side, we find that the dots were certainly present in 16 out of 32—that is, in well over 50 per cent. If we include the other two cases above alluded to the figure rises to 60 per cent!

In some of the specimens the dots are so large that they could scarcely be missed under a careful naked-eye examination (*vide Fig. 10*), whilst in others they were only discovered when highly magnified photographs of the eyeballs were thrown on a screen. (*Vide Fig. 9*.) They could, however, be found easily with a loupe once their presence was known. The variation in different specimens was not confined to size; some of the dots were white, others were a pale grey, and a few were bright and shiny. Again, some of them appeared much more sharply defined than others.

It was at first thought that manifestations so distinct under slight magnification would yield very definite appearances under the microscope; but, on the contrary, much difficulty has been experienced in deciding the nature of the changes which have given rise to this phenomenon.

One of the first points noticed was that the dots were found almost exclusively in long-standing cases. This of itself would appear to indicate that their cause was to be sought in some degenerative process; but a closer analysis of the histories revealed a probable fallacy in such an argument, since a number of the eyes had had good vision for a long period after operation, and had eventually succumbed to a fresh inflammatory invasion, or possibly to a more severe recrudescence of a septic condition implanted at the time of operation.

On examination of a number of specimens three distinct appearances have been found, any one of which might presumably account for the dots seen with the naked eye.

1. In some of the globes a proliferative retinitis can be found along certain of the vessels. (Fig. 25.) These consist in section of masses of mononuclear leucocytes surrounding the vessel wall and tending to make their way to the inner surface of the retina. It might be thought that such a change would produce lines rather than dots, and that those lines would run along the course of the vessels, but there are two features which make this doubtful: (a) even under the same field some of the vessels appear quite healthy on section, whilst others show distinct masses of proliferation, and (b) along the course of a vessel cut obliquely one may find the proliferative exudate confined to one part of its course, the rest being comparatively free.

2. In the neighbourhood of some of the inflamed retinal vessels above spoken of, one finds on the surface of the retina what appear to be free collections of mononuclear cells. (Fig. 26.) These are apparently of the same nature as the dots described by Straub on the posterior surface of the cornea and in the vitreous body. It will be remembered that he attributed them to chemotoxic action. It would appear not improbable that the same explanation holds for these retinal dots. It is of interest that though they occur in cases of long standing, the history of a subsequent inflammation, destructive to vision, is of a much later, and indeed of a comparatively recent date. The presence of such exudative masses would then be easily explained.

3. The grouping of these dots varies considerably in different specimens, but does not lend much colour to the idea that they are vascular in origin, for in some at least of the eyes they certainly do not follow the course of the vessels. On the other hand, in a few of the eyeballs there is a massing of these dots in the neighbourhood of the ora serrata, which is in itself suggestive of a degenerative process, since this is the area of lowest circulatory activity, inasmuch as this region is supplied by the ultimate twigs of the retinal vessels. This observation gathers interest from the fact that in quite a number of these specimens it is possible to demonstrate the presence of small cysts in the walls of the retina. (Fig. 27.) These cysts are produced by the coalescence of oedematous spaces in degenerative areas. All stages of the process can be traced in different specimens of the series before us. Such cysts are only likely to be met with in long-standing cases in which the degenerative processes have had time for full play.

Inasmuch as these retinal dots are found in the cases in which the retina is still in its normal position, it would seem probable that a careful clinical search should reveal their presence in living eyes now that their existence is established pathologically. It is a point which should repay the study of surgeons who are practising where couching is commonly resorted to, and especially in India.

## GLAUCOMA.

It has long been known that couching is frequently followed by secondary glaucoma. In the present series of 54 globes, 19 of them showed evidence of high intra-ocular pressure. This figure must not, however, be taken as a reliable index of the numerical frequency of glaucoma as a complication of the operation. On the one hand, we must remember that the present series deals with the failures only, and that a large number of eyes are met with clinically in which the lens is floating free in the vitreous chamber without any sign that the intra-ocular tension is raised. Again, the cases which go on to suppuration, and which are very numerous, are excluded from the present series owing to the fact that all such were eviscerated in order to avoid the risk of intracranial sepsis. This obviously diminishes the total number of globes under consideration, and thereby raises the apparent percentage of other conditions, such as glaucoma. On the other hand, it would be a mistake to suppose that out of these 54 globes only 19 had suffered from secondary glaucoma, for in 24 of them a complete detachment of the retina had covered up any evidence which may at some time have existed of the presence of increased intra-ocular pressure, though the conditions still found in some of them make it more than probable that the globes were formerly glaucomatous. In any case, it leaves us with the fact that out of 30 eyeballs which were available for accurate examination no less than 19 were glaucomatous. In 16 of the 19 the angle of the anterior chamber was extensively closed, and in 3 of these the chamber was so shallow as almost to be reduced to a potential slit. The remaining 3 are thus accounted for; in one the angle was widely open and there was free communication between the aqueous and vitreous chambers; in a second, a Morgagnian lens was impacted in the angle of the anterior chamber; whilst in a third the operation was followed by a very severe haemorrhage, which probably had the direct effect of over-distending the hyaloid cavity at the expense of the aqueous chamber.

Returning to the 16 cases, in which the angle of the chamber was closed, and to certain other eyeballs in which it seemed probable that glaucoma had at some time been present, we found that in every one of them one or other of the accepted causes of secondary glaucoma was revealed when looked for; in some, more than one such cause was discoverable. We shall content ourselves with enumerating these factors.

A corneal fistula, with evidence of past anterior staphylosis, was present in one; in one there was a capsulo-corneal synechia, and in another a retino-corneal synechia; in 5 the ciliary body was involved in the scar; in 6 the dislocated lens pressed extensively on the iris base; in 3 the lenses, tilted at right angles to their normal position, pressed the anterior hyaloid membrane severely back on the side of the dislocation, whilst causing the vitreous to bulge the iris forward into the anterior chamber on the opposite side; in 5 the pupil was blocked, and in 3 of these *iris bombe* was present; in 2 the anterior layers of the hyaloid were so thickened by inflammatory exudate as to suggest that there was an abnormal obstruction to the passage of fluid across the membrane; in one, a marked thickening of the lens capsule in the form of an after-cataract may possibly have provided an obstruction to the forward passage of fluid from the vitreous; lastly, there is one globe in which glaucoma had probably been present before the operation, if one may judge from the history of the case and from the violent haemorrhage which followed the couching.

It has been suggested that one of the causes of glaucoma after this operation is an advance of the front part of the vitreous body owing to a rupture of the anterior layers of the hyaloid during the operation. Without in any way denying that the suggestion may be a valid one in certain cases, the impression, gained from a study of this series, is that we need look no further than the well-recognised causes of secondary glaucoma. We have only to remember that the trauma inflicted is extensive and various, and that a greater or less degree of sepsis accompanies every couching in the hands of its Indian exponents.

## CONCLUSION.

In conclusion, it remains to express my indebtedness to those who have very kindly assisted me in various ways. Professor Keith has done everything in his power to help me. I owe Mr. Mudson my acknowledgments for kindly

cutting a difficult specimen for me and for his advice on its details. Mr. Treacher Collins has generously given me advice and assistance of the greatest value in the study of a number of the eyeballs and of the microscopic specimens made from them. I have acted freely on a number of the suggestions he has been good enough to make. The cutting of the microscopic specimens has been done by Mr. S. Stephenson and by Mr. Chesterman, to whom I am greatly indebted for the care they devoted to them. The photographs, both macroscopic and microscopic, and the lantern slides made from them, as also the stereoscopic pictures, have, with very few exceptions, been taken by Mrs. Elliot, without whose help the present work could not have been done. The exceptions were taken by my late assistant in Madras, Mr. C. Taylor, to whom, as well as to Lieutenant H. C. Crags and all my staff, I am deeply indebted for the loyal assistance they gave me during years of methodical and painstaking work. Major H. Kirkpatrick and Captain W. C. Gray (both of the I.M.S.) have put me deeply in their debt by the generosity with which they have helped me since I left India, placing their material unstintedly at my disposal. Dr. Ekambaram has given me much valuable and carefully gathered information. Messrs. Underwood and Underwood have kindly lent the stereoscopes used for these demonstrations.

## THE AGGLUTINATION CURVE AND ITS IMPORTANCE IN THE DIAGNOSIS OF TYPHOID AND PARATYPHOID FEVERS IN INOCULATED PERSONS.

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(A Report to the Medical Research Committee.)

IN February, 1915, one of us (G. D.), in conjunction with Ainley Walker and Gibson,<sup>1</sup> stated that accurate differential diagnosis of enteric group cases can only be obtained by routine testing of the serum of the patient against the three micro-organisms *B. typhosus* and *B. paratyphosus* A and B, in parallel series of observations, and by always determining the maximum dilution of the serum in which agglutination takes place. For individuals who have been inoculated with antityphoid vaccine within a period of some months or even years will, as we have shown, usually give a high agglutinin titre against *B. typhosus*.<sup>2</sup> Whether they are suffering from active typhoid infection or not can only be determined by repeating the agglutination test at intervals in order to ascertain whether the titre of agglutination shows marked changes or remains practically constant.

Further, a technique which had proved satisfactory for the agglutination test over a period of years and in a very large number of tests was re-described in detail. The advantages of this technique lay essentially in the employment of Standard Agglutinable Cultures for the performance of macroscopic tests. From July, 1915, such standard cultures and the equipment for carrying out the test were issued from the Department of Pathology in the University of Oxford on behalf of the Medical Research Committee for the use of the medical services of H.M. Army and Navy.

In March, 1915, we decided to study the agglutinin curves in a series of patients suffering from infection by bacilli of the enteric group, all of whom had been inoculated with typhoid vaccine. The necessary material was kindly placed at our disposal by Lieutenant-Colonel Evans, D.S.O., O.C. Stationary Hospital, B.E.F. A short paper embodying our results was prepared for publication late in the same year. But unfortunately it was destroyed by fire along with the majority of the curves and a mass of other data. Fortunately the data for few of the curves had been preserved in duplicate elsewhere, but pressure of other work has prevented us from reconstructing and publishing our intended article. The knowledge which we gained in the course of the work has, however, formed the basis of a number of

statements regarding the diagnosis of enteric fevers in typhoid-inoculated individuals which have been made in several succeeding publications.

We now propose to publish these surviving curves, with brief comments, as evidence confirmatory of the statements made by one of us (G. D.) regarding the importance of employing accurate quantitative methods in the performance of the agglutination test as applied for the diagnosis of infections of the enteric group in inoculated persons. We shall then be in a position to re-state and explain certain broad generalisations directly emerging from these data on

which diagnosis rests, and whose neglect has recently led Martin and Upjohn to reach conclusions which impugn the value of agglutination tests in inoculated subjects.

It will be convenient to begin by explaining certain terms employed in connexion with the technique of the use of standard agglutinable cultures.

1. *Standard Agglutinable Cultures* are prepared of definite opacity and measured agglutinability from strains of the bacilli concerned which have been specially selected for their high specificity. In successive batches of standard agglutinable culture the relative sensitiveness to agglutination of the

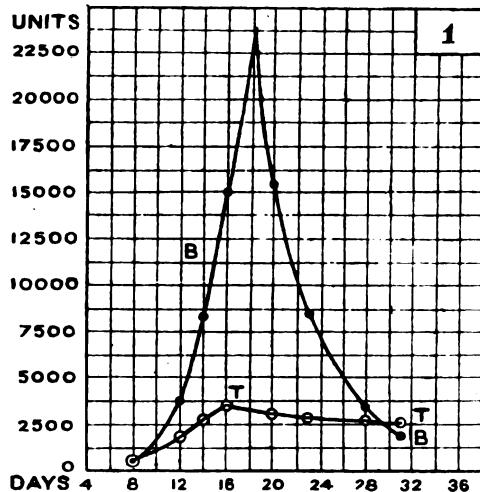


CHART 1.—*Paratyphoid B* occurring in a T.-inoculated individual. The B agglutinins rise rapidly from the first observation on the eighth day of the disease and reach the very high level (unusually high) of more than 15,000 units on the sixteenth day. As seen from the shape of the curve the maximum is even much higher than this and is reached about the eighteenth day. Thereafter the usual regular fall sets in at first rapidly, so that the units have fallen from somewhere about 24,000 to 8600 in the next five days, subsequently more slowly. Meanwhile the T. agglutinins have risen very markedly, though relatively much less. They attain their maximum of about 3500 units about the sixteenth day, some two days before the maximum of B agglutinins, falling from this point in a very gradual but quite regular curve to about 2800 units on the twenty-third day. After the thirtieth day B agglutinins, though still much higher than their level at the first observation, have fallen below the T. agglutinins, the titre in the two cases being 1800 units and 2500 units respectively, showing the greater persistence of the rise produced in the T.-inoculation agglutinins as the result of paratyphoid B infection than in the B agglutinins themselves.

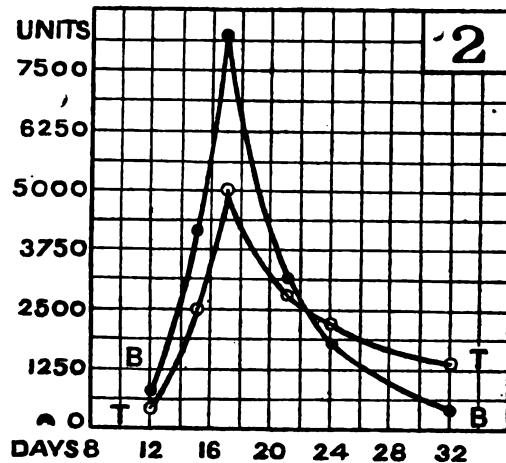


CHART 2.—*Paratyphoid B* occurring in a T.-inoculated individual. This curve is another example of a high agglutinin reaction to paratyphoid B infection. In this case both the absolute and relative increase in T. agglutinins caused by the paratyphoid B infection is greater than in the former example. The B maximum is reached on the seventeenth day, as is also that for T. agglutinins. The fall in T. agglutinins is much more marked than in the previous example, but the titre of B agglutinins falls even more rapidly so that the curves have already crossed on the twenty-third day. On the thirty-second day the B agglutinins stand at about 400 units while the T. agglutinins are 1400 units.

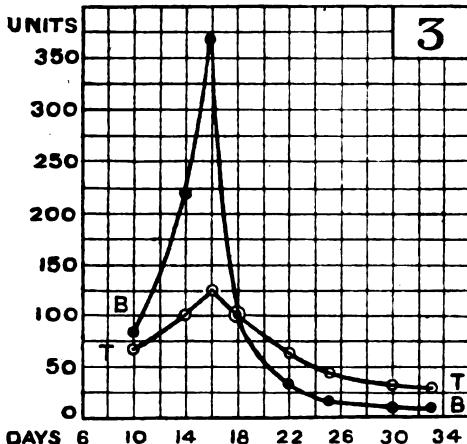


CHART 3.—*Paratyphoid B* occurring in a T.-inoculated individual. This curve shows a moderate agglutinin reaction to paratyphoid B infection. The B agglutinins rise from about 100 units on the tenth day of disease to a maximum of 370 units on the sixteenth day. Thereafter they fall very sharply, and two days later (on the eighteen day) are already down to 100 units. The T. agglutinins undergo a relatively marked rise and subsequent fall, reaching about 125 units on the sixteenth day, and thereafter undergoing a gradual fall and crossed by the paratyphoid curve, which falls below it from about the eighteenth day.

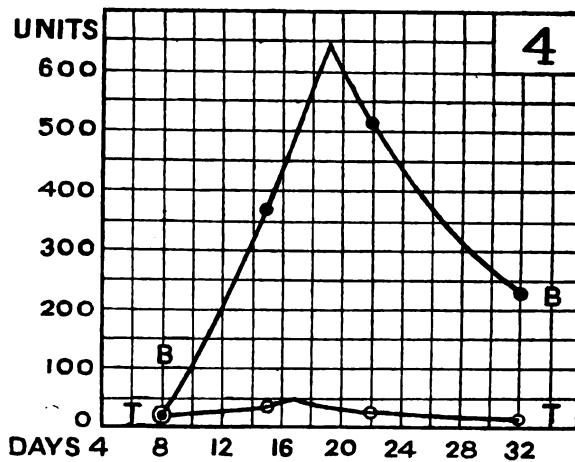


CHART 4.—*Paratyphoid B* in a T.-inoculated individual. This curve is introduced to show a case in which the absolute rise and fall in T. agglutinins caused by the B infection is only small, though the response of the B agglutinins is marked. Here the maximum of the T. agglutinin titre is antecedent (seventeenth day) to that of the B agglutinins (nineteenth day).

bacilli contained is indicated by a figure—the so-called *Reduction Factor*—the original standard agglutinable cultures having been arbitrarily given the figure 2·5 as reduction factor. The reason for this will appear immediately in connexion with the *Standard Agglutinin Unit*.

2. *Standard Agglutination* is the degree of agglutination present in the highest serum dilution in which marked agglutination without sedimentation can be seen by the naked eye.

3. The *Standard Agglutinin Unit* is that amount of agglutinating serum which when made up to 1 c.c. volume with normal saline solution causes standard agglutination on being mixed with 1·5 c.c. of the original standard agglutinable culture and maintained at 55° C. for 2 hours (in the case of dysentery agglutination 4½ hours) in a water-bath, followed by 15 to 20 minutes at the room temperature.

4. The *Reduction Factor*.—The total volume in which the reaction occurs being 2·5 c.c. (1 c.c. of serum added to 1·5 c.c. of standard culture) the original standard agglutinable culture was given the reduction factor of 2·5 to express the sensitiveness to agglutination of that particular culture. All subsequent batches of culture have been given reduction

factors calculated on this basis, thus securing constancy in the agglutinin unit. For example, if a batch of standard culture proves to be twice as sensitive to agglutination as the original standard, so that half the amount of serum produces standard agglutination under test conditions the new standard culture is given a reduction factor of double the size of the original factor—i.e., 5. Thus, whatever be the particular standard culture used to test any given serum the number of agglutinin units found per c.c. of the serum remains always the same, although the dilutions in which standard agglutination occurs will be different. Since when standard agglutination occurs in a serum dilution of 1 in  $x$ , then  $x$  divided by the reduction factor for the particular standard agglutinable culture used gives the number of Standard Agglutinin Units contained in 1 c.c. of the serum concerned.

5. *Readings*.—Owing to the rate at which the dilution increases in the series of tubes employed it will commonly happen that no tube in the series exhibits standard agglutination. If this be so, it will be found in looking along the series that while one tube shows strong agglutination with sedimentation the next succeeding tube shows no

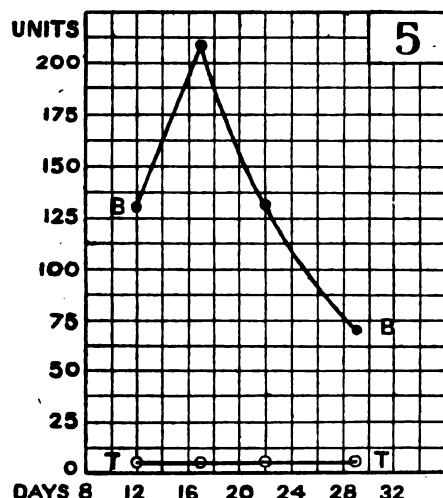


CHART 5.—*Paratyphoid B* in a T.-inoculated individual. This curve illustrates a case in which the T. agglutinin titre which stands at a low level remained unaffected by the B infection, though the B agglutinins reach a fairly high titre and show the usual curve of rise and fall, the maximum being reached on the seventeenth day.

CHART 6.—*Paratyphoid B* in a T.-inoculated individual. This curve shows one of the rarer cases of paratyphoid B in which the response of B agglutinins is small in absolute measure, though exhibiting the usual diagnostic rise and regular fall of active infection. The T. agglutinins are at a high level, but move very little in response to the B infection. Their maximum is reached about the eighteenth day, while the B maximum falls about the twenty-second day at a height which reaches only 20 units. From this point it falls steadily.

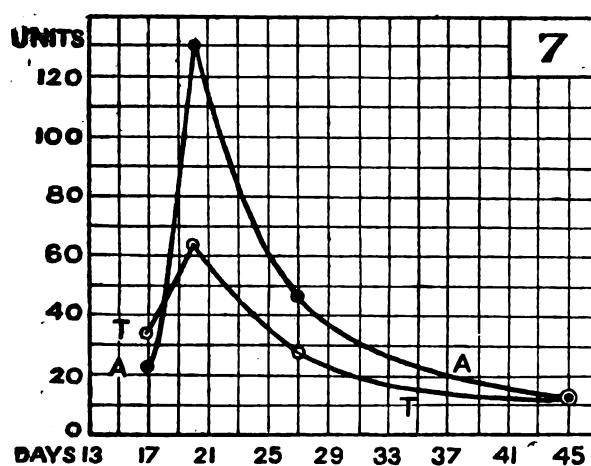
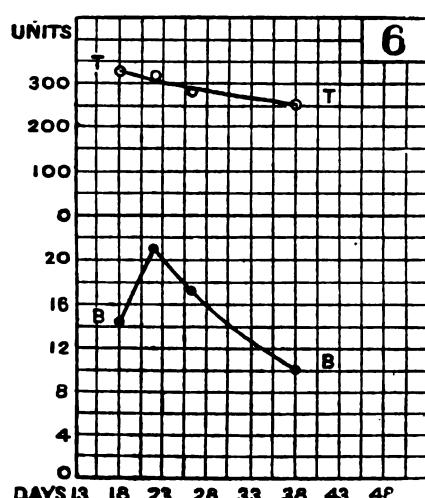
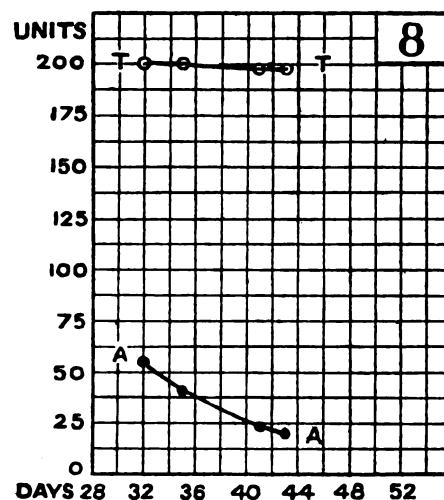


CHART 7.—*Paratyphoid A* in a T.-inoculated individual. The agglutinins rise rapidly from about 20 units on the seventeenth day of disease to their maximum of about 130 units on the twentieth day. Thereafter they fall rapidly to reach the level of about 45 units on the twenty-seventh day. The further course of the curve is shown in the chart. The T. agglutinins show a marked relative rise and fall with a maximum of about 64 units on the twentieth day. The fall is less steep than that of the A agglutinins.

CHART 8.—*Paratyphoid A* in a T.-inoculated individual. A late case. The T. agglutinins are at a high level, remaining practically unaffected by the A infection at a titre of about 200 units. The A agglutinins show a steady fall from 56 units on the thirty-second day of the disease to 20 units on the forty-third day.



agglutination or only a trace. In such cases standard agglutination lies approximately midway between the two dilutions. Though this method of making readings is amply adequate for diagnostic purposes it will be found that should a more precise determination of the limits of agglutination be required it can be obtained by using a stand of 12 tubes with the series of quantities given in the table contained in the Directions for Preparation and Standardisation of Agglutinable Cultures, where the successive dilutions of the serum only differ by about 20 per cent. Almost as accurate a reading can, however, be obtained with experience from the short series by taking note of the degree of agglutination present in each tube and by using a suitable interpolation table. This method has been used by one of us (G. D.) for a number of years, but was not introduced into the Directions for the Use of Standardised Agglutinable Cultures in order to avoid the appearance of unnecessary complications. But since it has been found of assistance by a number of workers to whom it has been privately communicated, especially where large numbers of cases had to be examined, it is now published here.

The principal terms employed in describing the different degrees of agglutination met with are "total" (t), "standard" (S), "trace" (tr), and "nil" (0). Total agglutination indicates the condition in which the whole, or practically the whole, of the agglutinated bacteria have settled down at the foot of the tube. Standard agglutination has already been described; the term Trace is applied to a very fine granulation recognisable by the naked eye. Around these main terms subsidiary differences congregate themselves as follows: Total minus (t -) marked deposit, but a number of floating flocculi remaining in the fluid. On each side of "standard" we find Standard plus (S +) and Standard minus (S -) respectively. In the former no deposit, but much larger flocculi than are seen in standard agglutination. In the latter finer agglutination than standard, with more the appearance of granulation in the fluid. Similarly, we recognise a Trace plus (tr +) and a Trace minus (tr -), the former representing something more than trace but less than standard minus, the latter being on the limit of naked-eye visibility. Finally, on occasion it can be difficult to decide with certainty whether a given tube is absolutely nil or not, the term query trace (tr?) is then applied.

These terms were originally worked out in the course of investigations in which long series of tubes were employed, since it was found that differences of the extent of those described were recognisable; and it appeared that if an ideal series was put up in which the dilution of the serum increased and diminished on each side of the tube presenting standard agglutination by some 12 to 15 per cent, it presented in successive tubes between total agglutination and nil all these different degrees of agglutination. Accordingly the following interpolation table was calculated:

t 1.46	S + 1.13	S - 0.88	tr 0.68	tr? 0.53
t - 1.29	S 1.00	tr+ 0.78	tr - 0.60	0 0.46

The table is used as follows. Supposing no tubes in the series shows S agglutination, but we have t- agglutination 1 in 250, and tr agglutination 1 in 500. It follows from the first of these readings that S agglutination would be found in a dilution of  $250 \times 1.29$ , i.e., 323, and from the second

reading S agglutination should be found in a dilution of  $500 \times 0.68$ , i.e. 340. The average of these two figures (331) is taken as the dilution which gives standard agglutination, and this number divided by the reduction factor of the culture used gives the number of standard agglutinin units per c.c. of the serum examined.

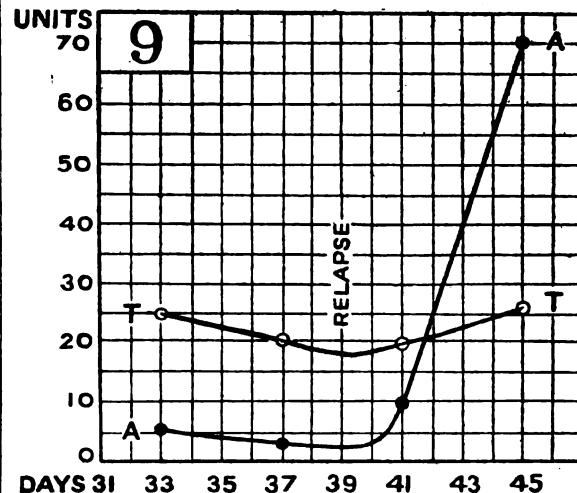


CHART 9.—Paratyphoid A in a T.-inoculated individual, where the original attack was followed by a relapse. This case is specially instructive since it illustrates both the fact that the development of agglutinins in paratyphoid A infection often only reaches a low titre, even at its maximum, and the fact that in a relapse of this infection there is frequently a very marked development of agglutinins. The T. agglutinins rise slightly with the original A infection, but in this case there is only a feeble T. response to the A relapse.

The figures from which the curves here given are drawn were arrived at by this method of making readings. In every case quoted the diagnosis was confirmed by the isolation of the infective organism from blood, stool, or urine. In the curves the actual observations are represented either by a dot or a ring. The dot mark is always used to indicate the curve produced by the infecting micro-organism.

These charts show how the enteric infections may be diagnosed in inoculated persons, by carrying out successive observations of the exact agglutinin titre of the serum for T., A, and B at suitable intervals (of about four days). They also show how entirely misleading it would be to draw conclusions from a single observation of the height of the titre since in many instances the titre for the infecting micro-organism may be found less than that for the inoculation

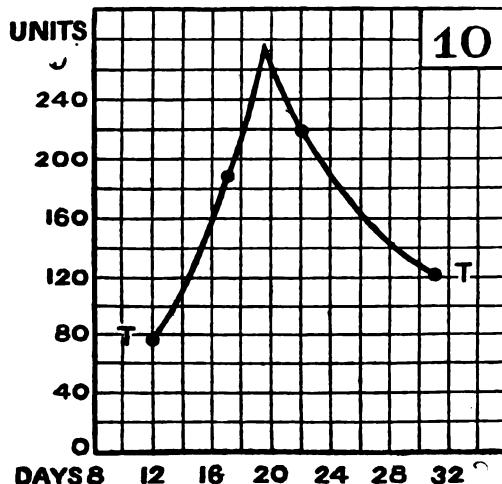
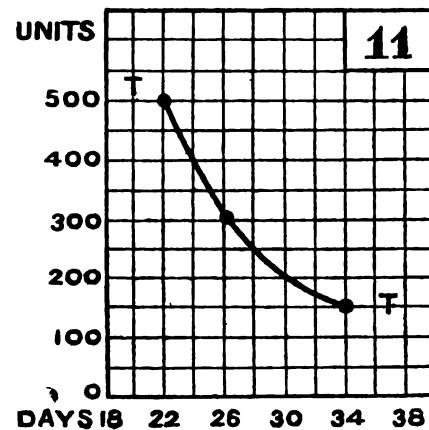


CHART 10.—Typhoid fever in a T.-inoculated individual. The curve shows the typical rise and fall in agglutinin titre, the maximum being reached about the twentieth day.

CHART 11.—Typhoid fever in a T.-inoculated individual. A late case. There is a typical fall in T. agglutinins from the first observation on the twenty-second day of the disease, when they stand at 500 units, to the last observation on the thirty-fourth day, when the agglutinin titre has fallen to 150 units.



agglutinins, and may indeed be lower throughout the whole infection. On the other hand, it is certainly the case that at its maximum the titre for the infecting micro-organism will usually exceed the titre of inoculation agglutinins even though these may be greatly raised as a result of the infection. Nevertheless, as the fall in titre proceeds the curve of A and B agglutinins falls more rapidly than the curve of T. inoculation agglutinins, so that the latter is cut by the former at some points in the fall.

The maximum agglutination titre for the infecting organism most frequently occurs about the eighteenth to twentieth day, and almost always lies within the limits sixteenth to twenty-fourth day of the disease.

As regards the effect of active paratyphoid infection on the typhoid inoculation on agglutinins one of three things may occur: (a) The titre may remain unchanged throughout the infection; (b) it may undergo a rise of moderate extent; (c) it may undergo a marked rise. When such rises occur it is found that they are either synchronous with or antecedent to the rise of agglutinin titre for the infecting micro-organism, and that the maximum falls somewhat earlier than the maximum for the infection agglutinins (or occasionally at about the same time). The change in T. inoculation agglutinins associated with paratyphoid infection is in general much more marked in the case of paratyphoid B than in the case of paratyphoid A.

In view of what has here been shown, it is obvious that it would be quite futile to try to fix a limit of agglutination titre for T.-inoculated individuals, and to proceed to diagnose cases which showed higher titres (even many times higher) as cases of active typhoid infection. The final guide in all these cases of enteric infection is the relative extent of the rise and fall in agglutination titre for the organisms concerned, together with period when the maximum titre is reached.

In a recent article by C. J. Martin and W. G. D. Upjohn these authors emphasise the existence of numerous difficulties in the diagnosis by agglutination tests of the enteric fevers in typhoid-inoculated persons. These difficulties might readily have been avoided had they taken cognisance of what has been repeatedly and clearly stated on this subject.<sup>3 4 5 6</sup> And they would have been saved from the conclusion that since the introduction of triple inoculation (T., A, B) "the interpretation of observations upon the agglutination of enteric organism will ..... be too difficult to possess any practical value, and the isolation of the infecting organism must be resorted to for diagnosis."

In a subsequent article it will be shown that although the difficulty of diagnosis by agglutination tests is to some extent increased by triple inoculation the validity of the tests is in no way impaired. They remain not only the most certain method of diagnosis, but form, in fact, the only method which can be relied upon if a large proportion of the cases are not to be missed. For it is well known that isolation methods fail to detect the infecting micro-organism in blood, stool, or urine in a majority of all cases of typhoid and paratyphoid fevers.

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## A SIMPLE ULCER OF THE OESOPHAGUS PERFORATING THE DESCENDING PORTION OF THE AORTIC ARCH AND CAUSING FATAL HÆMATEMESIS.

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SIMPLE ulceration of the oesophagus is, clinically, a rare condition, it is probably present more often than diagnosed, but death from the perforation of a latent ulcer of the oesophagus into the aortic arch must be very rare.<sup>1</sup> I beg, therefore, to take the liberty of recording this case. Of all parts of the alimentary canal in man ulceration is least commonly met with in the oesophagus.<sup>2</sup> A few cases of simple "peptic" ulcer of the oesophagus have been reported—one only is recorded which perforated the aorta. The following account is of a case of fatal haematemesis in an Englishman aged 36, which occurred in July, 1916, at Khartoum, and was due to the ulcer perforating the descending part of the arch of the aorta. The clinical history is as follows.

On July 21st, 1916, the patient consulted a medical man because he had, he thought, "something in the throat" and, as he had first noticed it after dinner on the previous evening when he had partaken of a dish of soft fish, he thought that he might have a fish-bone lodging in his throat. There being no clinical evidence of fish-bone or foreign body he was put to bed and given expectant treatment. His symptoms were as follows. He felt as if there was "something in the chest"; he felt it when he swallowed, more especially when he swallowed "nothing" and also when he drew a deep breath. He located this sensation, which was more discomfort than pain, inside the chest behind the sternum, at a place which would correspond to the level where the ulcer was eventually found. He also had some pain behind, which he located between the shoulder-blades. He had a thickly coated tongue; it was always thickly coated, he said, and the thermometer registered 100° F. on admission. There was nothing to be seen in the throat, no physical signs of anything amiss in the chest, and, in fact, the only symptom indicating that there was anything wrong were a rise of temperature to 100°, a coated tongue, and discomfort, sometimes amounting to a little pain, on swallowing or drawing a deep breath.

I am emphasising the total absence of serious symptoms, because seven days after the time when he first consulted a medical man about these small symptoms he had a large haemorrhage, and one day after this the fatal haemorrhage occurred. On July 23rd, the temperature being normal and the symptoms having almost disappeared, the pain having become diffused amongst the muscles of the back, as he said, he returned to his own house. On the 25th he was still having discomfort in swallowing and was admitted again into hospital. Again the temperature was 100°, and again it dropped to normal on the following day and remained so, and on the morning of the 28th, when I asked him to swallow a mouthful of water and also to draw a deep breath and tell me whether he had pain and where, he, after thinking for some time, said in both instances, "Well, I really cannot say that I feel anything at all now." I wish still to emphasise the absence of symptoms and physical signs, because we have reached the very day of the first haemorrhage, which was nearly fatal, and the day before the fatal haemorrhage; and yet, although the ulcer must already have attacked the aorta and was progressing and on the verge of perforating, there was nothing to indicate it but a dirty tongue and a little discomfort in the chest.

At 4 P.M., on July 28th, whilst reclining in a large chair, the patient brought up a little mucus streaked with blood. He was put back into bed. At 6 P.M. he vomited half a basinful of blood, clotted and fairly bright, which had evidently been retained in the stomach. No further visible haemorrhage occurred for 24 hours; evidently the opening into the aorta being a small one became plugged by a clot (this was seen post mortem). The patient seemed to be doing well and he was kept under morphia and given nothing which

<sup>1</sup> Osler (Principles of Medicine, eighth edit. i-n., p. 473): "Tleton collected 40 cases of peptic ulcer oesophagus (first described by Albers 1839). Six perforated the oesophagus and one perforated the aorta with fatal result."

<sup>2</sup> This immunity of the oesophagus is due to the fact that, taking very little part in digestion, it is simply a connecting tube of comparatively simple structure, vertical in position, and being accommodated in capacity it allows of the rapid transit of foodstuffs through it. It is therefore not much exposed to the danger of contracting disease from outside sources.

would tend to raise the blood pressure. The question of a gastrotomy was discussed and dismissed. In point of fact, as was subsequently found post mortem, the situation of the ulcer was inaccessible to operation. On the 29th, 24 hours after the first large haemorrhage at 6 P.M., he had another large haematemesis, evidently blood which had accumulated in the stomach having trickled down from the ulcer, and he died one and a half hours afterwards.

At the necropsy it was found that the haemorrhage came from an oesophageal ulcer which had become adherent to the descending part of the arch of the aorta, in the neighbourhood of the bifurcation of the trachea (Fig. 1), and which had

FIG. 1.

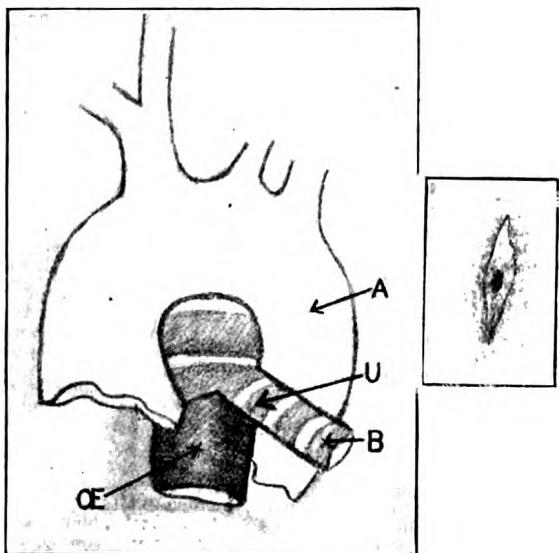


Diagram to show approximate size of ulcer (U) in oesophagus (OE) and the relation to it of the descending part of the arch of the aorta (A). B, left bronchus. A drawing of the ulcer perforating the aorta just behind the left bronchus is attached to the diagram.

penetrated the arterial wall. The stomach was very much distended, containing two or three pints of blood which had found its way down from the ulcer into the stomach and distended it. There were two other ulcers in the oesophagus, both situated at the cardiac end just within the oesophagus, one of which had healed with a cicatrix and the other, a larger oval one, in the process of healing. (Fig. 2.) Sometimes he had complained of a little pain in the epigastrum, and the situation of these ulcers would perhaps account for this. The stomach and all the other organs were healthy. The liver weighed 2½ lb., the spleen 2½ oz. The liver and spleen were examined particularly because the patient was said to have had kala-azar some years ago. In appearance they presented nothing abnormal (excepting the spleen, which was unusually small).

Non-malignant ulcers in the oesophagus are rare; they may be classified as follows:—

1. *Traumatic*.—Corroding fluid (swallowing of); sharp instruments (injury by); foreign bodies (such as fish-bone) blows, violence (bruising by).
2. *Latent ulcer*.—Which may perforate just as gastric ulcer.
3. *Specific*.—Syphilitic.
4. *Secondary ulcers*.—During the course, or as sequelæ, of diseases such as typhoid, kala-azar, diphtheria, scarlet fever, or pneumonia.
5. *Aneurysmal*.—Due to an adjacent aneurysm of the aorta, or other great vessel, ulcerating into the oesophagus.

The (1), (3), and (5) classes may be excluded at once in the present case.

(a) There was no history of anything which could have produced a traumatic lesion, not even a fish-bone; the other two small ulcers (nearly healed) at the cardiac end of the oesophagus are in themselves sufficient evidence against the perforating one being traumatic—both were chronic ulcers in the process of healing, and the fatal one was also a chronic ulcer. Perforating chronic ulcers (peptic) have been described in the oesophagus. They are rare; only a few cases are described.<sup>3</sup> Albers first

described them in 1839. Tileston collected 40 cases; six perforated and one perforated the aorta.

The same conditions do not exist in the oesophagus as in the stomach to give rise to ulceration. So that simple oesophageal ulcer must be a diagnosis based to a large extent on a process of exclusion. A definite diagnosis is, I think, impossible to make until haemorrhage takes place.

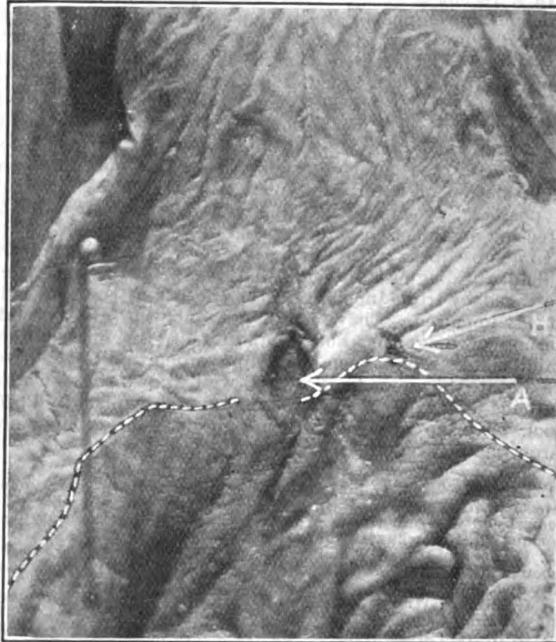
(b) Nor was it a syphilitic ulcer. There was no evidence at all to favour such a diagnosis.

(c) There was also not a single particle of evidence in favour of a diagnosis of aneurysm. Seen post mortem, the wall of the aorta was perfectly normal and healthy, except where the perforation was, and the patient had not had syphilis. His urine and kidneys were perfectly normal, and he had no aneurysm-producing disease.

There remains Class (4)—ulceration due to complications and sequelæ of former illness. Two possibilities suggest themselves in this case. The patient is said—I am bound to say on unconvincing evidence—to have contracted kala-azar in 1907. Now, ulceration of the intestines is a common complication of kala-azar, so it is worth while pausing just for a moment to consider this possibility. Suppose, for the sake of argument, that he did contract kala-azar in 1907. After his return to the Sudan in 1908 up to the time of his death in 1916 he appeared perfectly free from any suspicion of it, and at his death the spleen weighed only 2½ oz. and the liver 2½ lb. This, in addition to the fact that ulceration of the bowels is a late complication in kala-azar when the patient is very thin and weak, sufficiently, I think, disposes of the kala-azar theory.

There remains the theory of typhoid ulceration and sequelæ, and I must say at once that the evidence appears

FIG. 2.



Photograph of junction of oesophagus (above the line) and stomach (below the line) showing the two ulcers, one healed (H), the other active (A), situated just within the oesophagus.

to me in favour of this diagnosis—sequelæ after typhoid, although it was six years after the attack of typhoid fever. The two lower ulcers exactly corresponded to healing and healed typhoid ulceration (Fig. 2). The ulcers were chronic, and the symptoms were insidious and probably had lasted over a long period, giving time for the aorta to become adherent to the oesophagus. The appearance of the ulcers was oval in the long axis, base granular, surface shallow, edges smooth and overhanging, margins level, and not irregular and heaped up. (Fig. 1.)

The evidence—partly exclusive, partly of local appearance, partly of history—and the circumstances point to old typhoid ulceration. This is the opinion I myself hold, for it is the

only opinion which is, I think, consistent with the facts. Still an ulcer, of whatever origin, of the oesophagus, situated at the part which is in relation to the aorta so that it perforated, causing fatal haemorrhage, is rare. It might fittingly be placed in the category of "accidents of medicine." Six years had passed since the patient had had the typhoid fever, but the attack had been a severe one, and although the ulcers at the time of death may not have been specific in the sense that they were infected with Eberth's bacillus, still an old ulcer whose base had become fixed to the aorta might, owing to the strain of gymnastics or polo, resume activity, and this is how I view the case. A few days previous to his illness the patient had complained of some discomfort in the chest after gymnastics, and I think that probably this lighted up into activity an old ulcer which was adhering to the aorta—a sequela of typhoid six years previously. The original attack of typhoid, I am informed by the medical man who attended, was typical and serious. The patient had haemorrhage and he was carefully watched for perforation, and convalescence was long.

From general and microscopical appearances the ulcer was an old one. The aorta was with difficulty separated by dissection from the oesophagus in the neighbourhood of the ulcer, showing chronicity. The inflammation from the base of the ulcer had fixed the aorta to the oesophagus, and under the microscope there was an arteritis round the perforation in the aorta. The aorta having become fixed to the base of the ulcer as inflammation proceeded, it became in its turn the base and was involved in the processes going on. As ulceration slowly proceeded the artery became the floor of the ulcer; then softening of the arterial wall occurred and perhaps a little bulging (the arterial wall round the perforation was funnel-shaped and thinned, as if it had been bulging at this point). The bulging occurred, perhaps, when the patient had been doing gymnastic exercises on the day previous to admission. Then came ulceration of the aortic wall forming the floor of the ulcer, and the occurrence of the streaks of blood in the brought-up secretion, and two hours later perforation and the large haemorrhage on July 28th. Then the cessation of the haemorrhage caused by plugging of the small perforation by blood clot, and, finally, after an interval of 24 hours, the displacement of the cork of blood clot and fatal haemorrhage.

The above appears to have been the pathological sequence of events. There remains, however, the cause of the oesophageal ulcer. The general appearance of the ulcer itself, the presence of the two other ulcers, one quite healed and the other healing, at the cardiac end of the oesophagus, the noticeably coated condition of the tongue which the patient said he always had, would suggest that these ulcers had been present for a long while, and it is surprising that they gave rise to practically no symptoms. Perhaps they owed their origin to the attack of typhoid fever in 1910. This is likely, but there is no direct evidence. Perhaps it was a simple streptococcal ulcer, such as one meets frequently in the stomach, and much less frequently in the oesophagus.<sup>4</sup>

The case is, I think, remarkable not only for its rarity, but also on account of the total absence of serious symptoms up to 26 hours previous to death, when some streaks of blood were noticed in some secretion which the patient spat out.

The only subjective signs were a certain degree of discomfort, not amounting to pain, in the chest on swallowing, especially on performing the act of swallowing without swallowing anything in particular, and also in drawing a deep breath.

The objective symptoms were a noticeably foul tongue (which the patient said he always had) and a small rise of temperature, never over 100°, which twice descended to normal after 24 hours in bed.

From this case one may learn that a quiescent chronic oesophageal ulcer may cause no symptoms at all if we except the coated tongue. When the process becomes active there will be discomfort or pain located indefinitely about the level of the ulcer back and front. It is only when perforation into a vessel, organ, or cavity occurs that a definite diagnosis can be made. Perforation into a vessel large or small, causes obvious symptoms. Perforation into the left pleural cavity, which, I take it, is the commonest site of perforation for an

oesophageal ulcer, causes symptoms (subjective) very similar to those produced by perforating gastric or duodenal ulcers; but the physical signs in the one case are those of acute respiratory trouble (pleuritis), in the other acute abdominal (peritonitis). In the account of such a case of perforating oesophageal ulcer into the left pleural cavity by Dr. Graham W. Christie<sup>5</sup> two clinical points stand out and seem worthy of note: (1) The sudden pain and subjective symptoms caused by the perforation of an oesophageal ulcer into the left pleura suggested peritonitis, though in reality they were due to pleuritis, as was shown by absence of signs of general peritonitis; and (2) in perforating oesophageal ulcer the patient can sit up more comfortably than he can lie down, the opposite being the case in perforating gastric ulcer.

I have to thank Mr. Newlove, pathological assistant, Khartoum Civil Hospital, for helping me to put this little paper together.

Khartoum.

## CHRONIC EMPYEMA: THE VALUE OF DECORTICATION OF THE LUNG.<sup>1</sup>

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In this war there have of necessity been a large number of cases of penetrating wounds of the chest. In many of these there has been an accumulation of blood in the pleura of the side wounded which has cleared up after simple rest in bed. When dyspnoea, cough, or pyrexia has developed paracentesis has been most useful in effecting relief in the symptoms and a quick convalescence. There have been several excellent communications from the medical side which bear out this statement. Sometimes septic infection of the wound has been such that suppuration has taken place in the pleura, and the decomposing clot (and pus) has required evacuation through an incision into the pleura followed by drainage. When this operation has included resection of part of a rib, thus securing a larger opening, the result has been more uniformly satisfactory. In a smaller number closure of the empyema has been incomplete, and a sinus has remained which has proved a source of much discomfort and disability to the patient. Here there will usually be found a cavity of varying size in the pleura, the dimensions of which can be defined by means of a bullet probe, auscultation, and the X rays. This requires exploration under anaesthesia, with enlargement of the track, possibly combined with excision of overlying rib to ensure good drainage. The injection of bismuth paste has succeeded in some instances of moderate sinuses in civilian practice in effecting a cure, but until exploration has proved that no foreign body is there, and no fragment of bone is concealed behind the lowermost rib, its employment is not satisfactory after gunshot wounds. The cases in which the lung has not expanded after the first operation, remains collapsed and bound down to the side of the spine, are luckily few and far between. They are the most serious.

For the cure of an empyema of the most intractable kind, one in which the whole lung is bound down to the inner aspect of the chest cavity, and cannot expand, we have a difficult problem to solve. We are confronted by a cavity the walls of which are rigid and cannot come together to close the space, the ribs are unyielding and the lung so fixed that it cannot expand. It occupies a small part of the chest cavity and is quite functionless. With this local condition there is often a serious general state of exhaustion and emaciation owing to the effects of a prolonged discharge on a system already weakened by an attack of acute disease, or the severe shock of the wound of an important region. The state of the patient will naturally vary according to the duration of the mischief, the intensity of the infection, amount of purulent discharge, and accompanying pyrexia.

The fact that a lung might be released by removal of the covering membrane was not realised until recent years. We had to rely on operations calculated to permit an area of chest wall, which was adapted to the size of the suppurating cavity, to fall in to the level of the lung, from which no aid

<sup>5</sup> THE LANCET, 1915, ii., 17. Case of Perforation into Left Pleural Cavity (male, aged 60).

<sup>1</sup> Abstract of a Clinical Lecture delivered on Jan. 10th, 1917.

was expected. This object was attained by removal of some of the osseous structure of the chest wall, as advised in the operations known by the names of Estlander, Schede, and Depage. In the worst kind of empyema, where the cavity extended to the dome of the pleura, portions of the ribs had to be removed from the lower part of the cavity to the apex. This procedure could not be completed safely at one sitting on account of the attendant shock. Most of us have done one or more of these operations, but with reluctance, for they are mutilating and appear very cruel during their performance. Yet they have been often instrumental in saving life, and ensure closure of the empyema. They resulted, however, in a serious deformity of the chest, and in young people lateral curvature was certain to develop. The most important drawback, however, was the permanent loss of the use of the collapsed and imprisoned lung. The patient was sadly handicapped for the rest of his life by this. Occasionally this operation was accompanied by so much shock and loss of blood that he did not long survive it.

Of these operations the one which is known by the name of Schede has proved most useful, because not only are the ribs excised over the cavity to be obliterated, but the soft structures which have shared in the inflammatory changes which have spread through the costal pleura and become rigid, are also taken away. The remaining soft parts then fall in easily and do not form a rigid wall during later life. Failure generally resulted from inadequate removal of bone.

It is not easy to say to whom the idea of freeing the imprisoned lung, and so obtaining the restoration of what was for all purposes a lost organ, and at the same time a cure of the disease, first occurred. It may be that the possibility of this presented itself to many surgeons and pathologists at various times and in different countries long before the operation was put to the test. In these strenuous times it is not possible to go very closely into the history of the operation. It may be mentioned, however, that Terrier<sup>14</sup> states that Cornil first made the observation that the lung when bound down in chronic empyema could be relieved by removal of the overlying membranous layers so that it might once more expand. The application of the idea to operative surgery is rightly credited to Dr. G. Ryerson Fowler,<sup>1</sup> who operated for the first time on Oct. 7th, 1893. He independently came to the conclusion that the fixation of the lung in cases where it did not expand in old empyema was due to a greatly thickened pleural covering which could be safely removed.

His patient was a man who had been ill for two years and the result fulfilled his anticipations. The lung was retracted to the costo-pulmonary angle above the third rib. "The pleura was isolated by blunt dissection in the direction of the diaphragm until the latter was reached, then peeled off from the latter till the limit towards the mid-line was reached, when it was found to rest against the displaced pericardium, from which, after much difficulty, it was finally detached. This dissection was greatly impeded by the movements of the diaphragm, as well as those of the heart. It was completed by lifting the mass and finally detaching it from the lung above." Considerable expansion of the lung at once ensued and in 24 hours there was vesicular murmur to the level of the seventh rib.

Delorme,<sup>2</sup> to whom Dr. Lund<sup>14</sup> thinks most of the credit should be given for the introduction of the operation, made some experiments on the cadaver with a view of finding a better method of treating old empyema. He reported the results of his experiments to the Congrès Français de Chirurgie about April, 1893. His first operation was performed on Jan. 20th, 1894. The empyema was a tuberculous one and the patient died. His conclusions as to the possibility of freeing the lung have been fully confirmed. It is unlikely that Fowler knew of the experiments of Delorme, and therefore he is entitled to the credit which rightly belongs to the surgeon to whose initiative we owe an improved and successful method of operation for an intractable disease.

At intervals since the publication of Fowler's successful case, contributions have been made to various professional journals in other countries, to which reference can be made by those interested, which confirm Fowler's original estimate of the value of decortication. Modifications have been suggested which have lessened the severity of the operation which he performed at first, thus diminishing the shock produced, which is about the same as that which follows the operation of Schede.

Delorme<sup>2</sup> made a square flap from before backwards, the upper and lower margins following the lines of the third and sixth ribs. This was turned back on the soft parts as a hinge, which was at the anterior border of the scapula. It was afterwards replaced. It has been advised (probably from want of appreciation of the toughness of the enclosing envelope) that incisions sufficient to admit of fingers entering to separate the adhesions should be made. Much time will, however, be saved by the rapid formation of a flap of sufficient size to permit of certain and quick manipulation of the membrane to be removed.

The best time to perform the operation is when a patient with an empyema has recovered from the effects of the operation for evacuation of the pus, and there are still no signs of expansion of the lung. It has been successfully carried out more than three years (O'Dowd) after excision of a portion of rib followed by drainage. The lung even then expanded well and quickly.

In many it is inadvisable to remove ribs, or if sections of the ribs are removed the periosteum and muscles, with other soft parts, may be left. The lung expands in a surprising manner, and of itself may fill up the chest cavity. The importance of the maintenance of a rigid chest wall is evident.

The management of the partly organised material which covers the costal pleura and lung will vary, and surgeons recognise that it is unnecessary to strip off the casing from the pleura and diaphragm as well as from the lung. The object of the operation is to permit of expansion of the lung, and that is effected by limiting the stripping to the covering of the lung itself and the pleura adjoining where the new membrane is thickest. It is not needful to remove the whole of the covering of the costal pleura with the thickened costal pleura also as at first advised. This may be left untouched; the duration of the operation is thus shortened, the loss of blood diminished, and the shock rendered less severe.

The membrane which holds down the pleura may be very thick or very tough, therefore the difficulty in finding the lung will vary. It has been described as over one inch in thickness in one case. The incision should be made into it towards the posterior aspect, commencing above and deepened till the bluish-grey colour of the lung is seen; it is then prolonged to this depth for a varying distance with a pair of blunt-pointed scissors, and the lung at once begins to push through. By taking hold of the membrane on the posterior and then on the anterior aspect of the incision, beginning towards the apex, the whole lung is cleared. The amount of immediate expansion is often considerable, and the lung tends to fill the cavity in a few minutes; for this reason the more accessible parts should be left until the last. The haemorrhage is slight.

Ransohoff<sup>8</sup> has advised that the membrane should be treated by the making of multiple incisions (described as "division of pleura" and "gridironing") at right angles to each other, about a quarter of an inch apart, down to the lung. In cases where there is close adhesion to the visceral pleura this might prove of advantage, especially in tuberculous disease.

The loose attachment of the membrane in most patients renders its complete removal easy, and expansion is more complete. Slight injury of the lung in the process of stripping is of little importance, and haemorrhage is not great. One case of non-expansion during operation is recorded. Possibly more have been met with, but this should not prevent an attempt to free the lung in any patient in whom it appears reasonably likely to succeed. The prognosis in chronic empyema of tuberculous origin is not good. Occasionally fibrous bands are found passing from the membrane into the lung; these should be divided without hesitation. Even inseparable adhesion between the lower lobe and the diaphragm may not hinder a satisfactory result. Fuller expansion may be obtained during the after-treatment and contact of the lung secured with the chest wall by the method of blowing water from one bottle to another by means of a tube. It is not necessary to stitch the lung to the costal pleura, although it has been done with success by some surgeons.

The communication from Mr. Spencer<sup>20</sup> on "decortication for traumatic empyema with complete collapse of the lung" is the only one on this subject which has been published in this country so far as I can ascertain. There are, however, references made to this operation in some of our own text-

books. Unfortunately, these are occasionally founded on a complete misconception of the pathology of the disease and a wrong estimate of the benefits which may be obtained from "decortication."

The question of the anaesthetic which should be used may cause some anxiety in these cases; probably every kind has been tried, including intraspinal injection, but in the following case, where the ultimate result has been so satisfactory, Dr. Z. Mennell kindly gave ether by the intratracheal method. The condition of the patient was satisfactory throughout the operation and respiration perfectly unembarrassed.

At the present time there are several empyemata in the beds under my care at St. Thomas's, in some of which it may be advisable to do decortication of the lungs. The following has proved conclusively the great benefits to be derived from it:

Captain —, aged 28, was admitted to St. Thomas's Home from France on April 23rd, 1915. He had received a perforating wound of the left side of the chest on March 10th during the fight at Neuve Chapelle. He could not be moved for some days, but an operation was done at the base hospital on March 24th, the day after his arrival there, when a portion of rib was excised and a tube put in. "So much pus came away that the quantity could not be measured." On admission to St. Thomas's he was using a drainage-tube which passed through an opening in the sixth rib in the mid-axillary line, and from this there was a profuse purulent discharge. Above the spine of the left scapula there was a sinus with granulating opening which led to a comminuted fracture of the underlying ribs. Both wounds were septic, and he was thin and anaemic, had a rapid pulse, with a temperature which was always higher in the evening (99°–101° F.). He complained of considerable pain in the side, especially at night, and it was necessary to give morphine to relieve this. There was also a paroxysmal cough with much frothy expectoration.

His general condition improved enormously during the next few weeks, and the morphine was gradually discontinued. Attempts were made to leave out the large tube as the quantity of discharge diminished, but they were not successful. There were no signs of expansion of the lung. The breath sounds were absent excepting quite at the apex, and the whole of the left chest was in a condition of pyopneumothorax. As this appeared to be stationary and the general state was much improved, on the advice of Dr. Hector Mackenzie the chest was explored with the view of doing decortication of the lung.

On May 21st, a month after admission, a large oblong flap was made, parts of the fourth, fifth, sixth, and seventh ribs removed above the sinus, and the thoracic cavity quickly opened up. The lung was covered with a thick greyish-yellow, wash-leather membrane which prevented expansion and fastened it down to the posterior and inner part of the space. The cavity extended upwards in the direction of the apex and was apparently limited only by the dome of the pleura. A strip of this dense membrane was now separated with difficulty from the surface of the lung, beginning at a point as high as possible, to the lower limit of the cavity, and from the raw surface thus made the membrane was peeled forwards and backwards. The lung quickly began to expand, and by the time the process of stripping was completed was almost in apposition with the chest wall, in the position of full inspiration. The bleeding was slight. No attempt was made to peel off membrane from the costal pleura or diaphragm. A tube was placed in the lower part of the cavity and the flap sutured in position with catgut after all debris had been washed away with sterilised saline.

There was considerable shock after the operation, but the patient rallied well. For the next few days the chief menace came from attempts at oedema of the right lung, giving rise to dyspnæic attacks associated with a frothy exudate which was profusely expectorated. Relief was almost immediate after the exhibition of atropine hypodermically.

The recovery was somewhat slow, as it was a long time before it was possible to give up the use of the drainage-tube, various attempts to do so being unsuccessful on account of a re-accumulation of discharge. Towards the end of September it was found possible to omit it, and by Nov. 22nd, 1915, he was able to leave for the seaside with the wound closed.

Bacteriological examination showed that the *Streptococcus pyogenes* was the chief organism at work, but there were several others, and it was not considered possible to make a vaccine which would have been of use before operation.

Dr. Hector Mackenzie kindly examined this patient on Jan. 9th, 1917, and has reported as follows: "There was good resonance and vocal fremitus, and the breath sounds were well heard over the whole of the left lung down to the base. The left lung appeared to be expanded and to be acting efficiently. The general condition was very satisfactory." *Continued at foot of next column.*

## REPAIR OF LARGE BONY DEFECTS IN THE SKULL BY MEANS OF A METAL PLATE,

WITH A RECORD OF THREE CASES.

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In the large majority of cases in which there has been loss of substance of the bony parts of the skull, either from trephining or direct injury, there is no need of any operation to repair the bony defect. When only a small piece of bone has been removed by trephining, the edges of the trephine wound will become rounded off and smooth, and the hole in the skull will become filled with dense fibrous tissue, so that after a lapse of six months the defect will be hardly palpable. There are, however, a certain number of cases in which some operation for repair of the extensive damage done should be undertaken. Different methods have been described. Maget has recorded cases of restoration of cranial substance by insertion of an osteoplastic flap out from the external table of the skull in the vicinity. Morestin has described the use of cartilaginous transplants, while Ester has related a series of cases in which he repaired the skull after trephining by means of gold plates. The recorded cases would suggest that the method of repair by means of a plate is satisfactory, simple, and easy.

### *Indication and Contra-indication for Operation.*

There has been considerable discussion as to whether defects in the skull should be closed, but most surgeons would probably now agree that, briefly stated, the indications that some operation should be done are as follows:—

The hole in the skull, if large, should be closed for the sake of freeing the patient from the dangers to which he is subjected by having the brain insufficiently protected, and because the bones of the skull regenerate scarcely at all.

The mental condition of many patients with head wounds is often markedly affected. It is important before doing any plastic operation to observe the patient carefully and to be satisfied that his mental state is good. The best results in these cases will be obtained by operating on patients who are anxious to have "the hole" in the head closed. Those on whom I have operated were all much troubled by the fact that they could feel a large gap in their skulls, and they were all very anxious to have it closed.

*Pain.*—There are two main types of pain from which these cases suffer—namely, headache and severe tenderness in the region of the scar. The headache varies much in severity; all the cases which were operated on complained of it, but it was not of a very severe type. All were improved by the operation. Tenderness over the scar was in one case so severe that the patient could not wear even a soft cap. The operation completely cured this in every case.

*Continued from preceding column.*

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*Inability to sleep* is occasionally complained of. This was a prominent symptom in two of the cases operated upon. The operation improved both cases.

*Pulsation of the brain* over the trephined wound was complained of by all the patients operated on. Though not a severe symptom, it appeared somewhat to worry them. The operation cured this in every case.

The condition of the scalp is most important. The scalp wound must be absolutely healed before any operation can be considered. An unhealed scalp is an absolute contraindication to any operation.

#### Operation.

*Preparation.*—The whole head is shaved 36 hours, and again prepared 4 or 5 hours, before the operation. Morphia  $\frac{1}{2}$  grain and atropine  $\frac{1}{60}$  grain are given half an hour before the anaesthetic is administered.

*Operation.*—The head is supported on a sandbag or special rest at a convenient height. A large semilunar incision is made with its base below. The flap should be so arranged as to expose fully the previous trephine hole with a margin of about  $\frac{1}{4}$  inches of skull bone surrounding it. The incision at the margin of the wound divides all the layers of the scalp with the exception of the periosteum. The flap is then dissected up from the periosteum for about  $\frac{1}{2}$  inch at its margins. The periosteum is then divided, and the remainder of the flap consists of all the layers of the scalp, together with the periosteum. At the margin of the trephine hole a quantity of scar tissue will be encountered. It is usually possible to separate it by a series of cuts without any exposure of brain tissue, so that when the centre flap has been raised the trephine hole is exposed, "plugged" with dense fibrous tissue. During the process there is usually free bleeding from the edges of the wound, but a few tissue forceps applied to the edge of the flap are sufficient to stop this, and no tourniquet round the head is necessary. The edges of the flap are then covered with gauze and saline at  $118^{\circ}\text{F}$ . is poured over the wound to stop any general oozing. The edges of the periosteum are then raised from the bone, and the plate, suitably cut, is passed under it, and pressed down flat on the skull. It is fixed in position by a few catgut sutures, the skin is then sutured over the plate, and if necessary a drainage-tube is inserted at one corner of the wound. Dressings are applied with firm pressure. The tube is removed at the end of 48 hours, and the wound is not again disturbed until the tenth day, when the stitches are removed.

#### Notes of Cases.

**CASE 1.**—Gunshot wound of head; destruction of part of right parietal bone; repair by metal plate. Patient aged 24. R.F.A., was transferred to Norfolk War Hospital on April 11th, 1916, complaining of pulsating swelling on right side of head. He was admitted to 15th General Hospital at Alexandria on Feb. 8th, 1916, with injury of right side of head. He was found to be suffering from cerebral compression, giving rise to paralysis of left arm and leg. An operation was done, skull trephined, dura mater opened, and a quantity of blood-clot removed from the surface of brain. He had since suffered from severe headache, with pain and tenderness over wound. The headache was severe, often keeping him awake at night, and the pain and tenderness over the wound were such that he could not wear a cap without discomfort. The pulsating swelling on side of head had gradually decreased, and he had quite recovered from paralysis of left arm and leg. He had no fits, his memory was good, and his mental condition was unimpaired.

On admission to Norfolk War Hospital (April 11th) he was rather pale, but otherwise healthy-looking. Temperature  $98^{\circ}\text{F}$ ., pulse 80, respirations 20. Eyes—pupils equal and reacted to light. Tongue protruded straight; no facial palsy, all cranial nerves appeared normal; mental condition good. In region of right parietal bone was well-marked pulsation, both seen and felt. The operation wound was almost quite healed. On palpation skin over pulsating area was markedly tender; margins of trephine hole could be easily felt; no well-marked cerebral hernia. June 1st: Wound quite healed.

June 29th: Operation; hole in skull closed by silver plate. Wound healed by primary union. Patient was discharged from hospital much improved, all his symptoms having disappeared except occasional slight headaches. The plate in head could scarcely be felt, and gave rise to no trouble.

**CASE 2.**—Shrapnel wound of head; destruction of part of parietal bone; repair by metal plate. Private, aged 26, was wounded in head by piece of shrapnel in May, 1916. Soon after being wounded he was trephined at a casualty clearing station; piece of right parietal bone removed. Progress was satisfactory, and he was admitted to Norfolk War Hospital on May 15th. On admission his general condition was good. Temperature  $98^{\circ}\text{F}$ ., pulse 80, respirations 20. Memory for recent events poor. Did not complain of any headache. Cranial nerves appeared normal. No paralysis, but slight weakness of left leg.

Wound over right parietal region still required dressing; pulsation over this area seen and felt; no cerebral hernia. The wound healed well, and he was discharged to an auxiliary hospital on June 6th. When again seen on August 10th the head wound had quite healed; scar firm and not tender. He complained of severe headache and said the "hole" in the head worried him very much. His mental state appeared fair, his memory had improved.

August 26th: Operation; hole in skull closed by plate. Wound healed by primary union, but four days after operation he became somewhat depressed and refused food. His mental condition gave rise to some anxiety for about 14 days, but he gradually improved and left the hospital apparently quite well on Sept. 17th. The plate in the head could not be felt, and gave rise to no pain or inconvenience.

**CASE 3.**—Shrapnel wound of head; destruction of part of parietal bone; repair by metal plate. Private, aged 22, wounded in head about June 28th, 1916; was trephined two hours afterwards at a casualty clearing station, and piece of right parietal bone removed. On June 30th he was transferred to Calais, and on July 4th was admitted to the Norfolk War Hospital. On admission his condition was as follows: Temperature  $98^{\circ}\text{F}$ ., pulse 80, respirations 20. Mental condition good, cranial nerves normal. No paralysis. Wound over right parietal region; pulsation marked, but no cerebral hernia. His progress was satisfactory, the wound healed, and he was sent to an auxiliary hospital on July 31st. When seen again, on Sept. 4th, he complained of headache, pain in scar, and pulsation of brain troubled him, especially when he moved about. His mental condition was good. On Sept. 19th the hole in the skull was repaired by means of a plate; wound healed by primary union. At end of ten days he was able to get about again. He still complained of headache, but this gradually improved, and he was discharged from the hospital in December. The wound was quite healed and painless. The plate could not be felt and he was much improved by the operation.

## A CASE OF ACUTE OSTEOMYELITIS OF THE SPINE.

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THE following case of acute osteomyelitis of the spine, recently in the Royal Naval Hospital, Plymouth, is recorded on account of its rarity and the interesting problem in diagnosis which it raised.

The patient, aged 21, schoolmaster R.N., went sick ashore on Sept. 23rd, 1916, complaining of "severe pain in the back and left loin." He stated that he had had a cold in the head about a week before, and that the pain, which he had at first treated as lumbago, had started two days before. He had otherwise been in good health, and had not had any injury. When first seen his temperature was  $103^{\circ}\text{F}$ ., and he looked ill. No physical signs were found to explain the pain, and as the symptoms were not relieved by simple remedies he was admitted to hospital on Sept. 25th, under the care of Fleet-Surgeon R. St. G. Bond, R.N.

On admission his temperature was  $102^{\circ}$ , pulse 102, respiration 32. His skin was dry and flushed, his tongue very dry and beefy-red, and his general appearance suggested a severe toxæmia. He complained of constant pain in the small of the back, radiating round the loins to the umbilicus, the pain being more severe on the left side. There was tenderness to pressure over the upper end of the sacrum and the lower lumbar spinous processes, and the patient could not move freely or sit up, but there was no swelling or deformity of the back. The abdomen was somewhat distended and tympanitic. There was deep tenderness on both sides in the middle line in the umbilical region but no rigidity, and the abdomen moved freely with respiration. There were no abnormal signs in the chest. The urine was normal.

The condition remained much the same on the following two days, the temperature fluctuating between  $99^{\circ}$  and  $102^{\circ}$ , the pulse remaining rapid and the patient looking very ill. On Sept. 27th lumbar puncture was done and 3 oz. of thick creamy pus withdrawn from the spinal canal. From this *Staphylococcus aureus* was subsequently grown. There were no symptoms pointing to meningitis, and it was therefore thought probable that the pus was of extrathecal origin. The same afternoon some paresis of the legs, more marked in the left, developed, suggesting pressure on spinal roots. The knee-jerks were obtainable but weak, and plantar reflexes were flexor. In consultation with Surgeon-General G. R. Turner and Fleet-Surgeon Bond a provisional diagnosis of acute osteomyelitis of the spine was made, and laminectomy decided upon to relieve the pressure upon the cauda equina and to establish drainage.

**Operation.**—A median dorsal incision was made with the centre over the third lumbar spine. On separating the muscles from the left of the spines about 3 oz. of pus were evacuated; no bare bone could be felt by the finger and the pus appeared to be oozing out of a neural foramen. The third lumbar lamina was removed and similar pus at once welled out of the spinal canal. On mopping this away the theca was seen to be intact and pressed forwards against the posterior common ligament. No bare bone was found, and in the absence of any definite localising signs nothing further was done. A tube was inserted down to the spinal canal and the wound stitched up round it. The patient did not suffer shock, but there was no improvement in his condition the following day, except that the paresis of the legs was no longer present. In the evening his temperature reached 104°, his pulse rapidly became worse, and he died from heart failure on Sept. 29th. There were no symptoms of meningitis before death.

**Autopsy.**—On the same day an autopsy was performed. On stripping the psoas muscles from their origins pus was found oozing out of all the lumbar neural foramina into the muscles, where several small and separate pockets had formed. The pus had in addition tracked along the posterior primary divisions of the nerves into the lumbar muscles on each side. On opening the spinal canal pus was found on the posterior aspect of the theca extending from the last dorsal vertebra to the lower end of the sacrum; no extrathecal fat was visible, there was no leptomenigitis. The bodies of the vertebrae and the sacrum were minutely examined for an infective focus without success, but it is regretted that the laminae and transverse processes escaped a close examination owing to their being put aside and mislaid. All the thoracic and abdominal viscera were normal and no septic focus was discovered elsewhere in the body.

**Etiology.**—Acute osteomyelitis of the spinal column is fortunately a very rare disease, and in his exhaustive paper on the subject, written in 1911, P. Grisel<sup>1</sup> was only able to collect 85 recorded cases.

Like acute osteomyelitis of the long bones, it is essentially a disease of the growing skeleton, and—remembering that growth of the spinal column is not complete until the thirtieth year—it will be found that only one case (reported by Makins and Abbott<sup>2</sup> in a woman aged 46) does not fall into this category. The majority of cases occur during the second decade of life, and there are only 15 recorded in patients over 20. A history of injury in the form of a blow or a sprain of the back is forthcoming in about one-quarter of the total number, a fact which may explain the relative frequency of the disease in males rather than females (2 : 1); in a larger number there is some discoverable source of infection, very commonly furunculosis. The responsible organism is almost exclusively *Staphylococcus aureus*; *Staphylococcus albus* and *Streptococcus pyogenes* have been rarely found.

**Morbid anatomy and pathology.**—Any portion of the vertebral column may be affected, but the disease shows a preference for the lumbar vertebrae, which form its site in rather more than 50 per cent. of all cases. The cervical column comes next in frequency and the dorsal column last.

The infection may be limited to the body of a vertebra or to some part of the neural arch, and it may affect one vertebra only or several simultaneously. Further, it may take the form of a simple periostitis without massive necrosis, but more commonly occurs as an osteomyelitis with more or less extensive necrosis.

The gravity of the disease varies largely with its depth from the surface of the body; when the centrum alone is affected the mortality is as high as 60 per cent., while when the neural arch alone is affected it is as low as 25 per cent., and if it were not that in these latter cases the liability to an intraspinal spread is greater, the difference would be still more marked. The reason for this difference is purely an anatomical one. When the focus is in the body of a vertebra the pus usually collects in front of the vertebral column and forms a retropharyngeal, mediastinal, or psoas abscess, according to the level of the disease. When, on the other hand, the focus is in the neural arch the pus naturally tracks posteriorly and points in the back. It is clear that it there permits of earlier recognition and treatment. An acute retropharyngeal abscess may be recognised with equal promptitude, but a mediastinal and a psoas abscess necessarily remain undetected for a longer period, and indeed an acute psoas abscess has only once been opened during life. Not uncommonly an anterior and posterior abscess may develop simultaneously, and the cavities may then communicate with one another. Makins and Abbott<sup>2</sup> record two cases in which an abscess forming primarily in the psoas sheath tracked to the buttock, passing in the one case through the great sacro-sciatic foramen, and in the other over the crest of the ilium.

Of complications the intrathoracic are the most frequent—empyema, pneumonia, abscess in the lung. They may

arise by direct spread or by pyæmia. They call for little comment. Intraspinal abscess has been recorded in 31 out of 85 cases, and 21 of these proved fatal. In 12 cases the bony focus was in the bodies, and 11 were fatal. In 19 cases the focus was in the neural arch, with 10 deaths. It is a complication, therefore, which is far more grave where the focus is anterior to the cord. In origin the abscess is always extrathecal. It may be localised by adhesions and then has been known to cause a compression either of the cord or of the cauda equina, which in one case (Hunt<sup>3</sup>) was relieved by operation; but it is more usually diffuse: meningitis and meningo-myelitis may follow by lymphatic spread, without actual perforation of the meninges, and are always fatal. The only recorded cases of actual perforation of the meninges have resulted from operation (Lucas,<sup>4</sup> Rebizzi<sup>5</sup>). Cerebral abscess and cerebral meningitis have been known to occur by pyæmic invasion (Makins and Abbott,<sup>2</sup> Joel<sup>6</sup>).

**Symptomatology.**—Clinically, the cases fall into two groups.

In the first or fulminant form, fortunately the less common, the patient is taken suddenly and acutely ill with intense pain in the back, a rigor, high temperature, and all the signs of a grave intoxication, and dies within a few days before any local manifestations have appeared to permit of an accurate diagnosis. This group includes the more severe cases with the focus in the body of a vertebra, and the deep-seated abscess which forms is only recognised at autopsy.

The second and larger group presents a clinical picture which in its simplest form closely resembles that of osteomyelitis of the long bones. The onset is abrupt, with localised pain in the back, pyrexia, and the accompanying signs of an acute infection. On the first examination the affected part of the spine is found to be tender and rigid; the patient assumes the supine position and cannot move without severe pain, but there is no swelling of the back. After the lapse of a few days a swelling appears to one or both sides of the mid-line of the back. At first hard and brawny, with dilated veins upon its surface—a point on which Lannelongue<sup>7</sup> lays stress—the mass gradually softens and is recognised as a pointing abscess. The subsequent progress of the case varies with the gravity of the infection and the extent of the complications. Under favourable conditions a sequestrum is found loose at the bottom of the abscess and is removed, the severe symptoms subside, and the drained cavity slowly heals. In a large number of cases, however, the course is by no means so smooth. Symptoms arise which betray the existence of intraspinal suppuration or of the persistence of the infective process, and all too commonly the patient succumbs to meningo-myelitis or septicæmia.

**Diagnosis.**—The difficulties in diagnosis arise entirely in the early stages before the local signs of an abscess have developed, and are well illustrated by the case cited in this paper. The problem necessarily varies with the portion of the spine involved, but in every case the cardinal factor is the co-existence of (a) a grave toxæmia, and (b) persistent, localised pain, tenderness, and rigidity of the back.

The clinical picture may be said to resemble a condensed epitome of Pott's disease without deformity. Thus in the case reported there was first (a) localised pain over the lumbar spine, shortly followed by (b) girdle pains round both loins, and accompanied by (c) local tenderness, rigidity, and pain on movement, and finally followed by (d) the signs of compression of the cauda equina. It is by laying stress on the occurrence of some or all of these signs in association with the evidences of an acute infection that a diagnosis may be arrived at in the early stages. The appearance of an abscess may be delayed for several days, and although operative treatment, which alone offers hope of saving life, must be postponed until this decisive evidence appears, it is clearly of the greatest importance to recognise the disease at the earliest moment, in order not only to prevent the patient from being subjected to the consequences of a mistaken diagnosis, but also to concentrate the attention on the back, and ensure interference as soon as opportunity offers.

The possibility of locating an abscess in the muscles of the back by an exploring syringe at the first stages of induration must be borne in mind, for valuable time may be saved by acting before the abscess is pointing superficially. In the case reported the diagnosis was made as a result of a lumbar puncture undertaken in order to exclude meningitis; with one exception this is the only recorded case in which a diagnosis has been made in this way. The danger of infecting the meninges is so obvious that it cannot be recommended as a routine method of examination. At the same time, owing to the close connexion of the theca with the posterior common ligament, an extrathecal collection will tend to form behind and not in front of the cord, so that the risk is thereby minimised, and if there is clear

evidence that compression paraplegia has developed, lumbar puncture would seem to be a legitimate procedure.

**Differential diagnosis.**—The differential diagnosis necessarily varies with the part of the spinal column affected.

(a) When the focus is in the cervical column there is less chance of an error than elsewhere. A deep glandular abscess may be excluded by the fact that pressure on the vertex causes referred pain in the neck. Makins and Abbott also lay stress on the early widening of the neck from extensive oedema, a sign which points to the shutting up of a small quantity of pus deep in the neck. Meningitis may be excluded by the absence of mental changes and rigidity of the limbs.

(b) Occurring in the dorsal spine the disease has been taken for pneumonia, empyema, typhoid, and peritonitis. Either pneumonia or empyema may result from a forward extension of the abscess, and the mistake is therefore usually that of regarding them as the main disease rather than as complications. Enteric may be simulated when the vertebral bodies alone are affected and the patient rapidly lapses into a "typhoid state," the abscess being totally concealed. The early localisation of pain and the abrupt onset are the features which should focus attention on the spine. Enlargement of the spleen may occur in either case, and is therefore of no diagnostic significance. The confusion with peritonitis is referred to below.

(c) In the lumbar spine the disease has been mistaken for peritonitis, perinephric abscess, meningitis, and Landry's paralysis.

The confusion with peritonitis is due to the frequent occurrence of referred abdominal pain and of abdominal distension. The latter has been noted in several cases and has been variously attributed to the acute toxæmia and to involvement of the sympathetic chain in the abscess. But the mistake is one which should not occur if attention is paid to (i.) the character of the pain, its point of earliest onset and greatest intensity, and to (ii.) the relative mildness of the abdominal symptoms compared with the gravity of the general condition.

Perinephric abscess may be harder to exclude on account of the time that it may remain latent while causing grave symptoms. The points of difference are that perinephric abscess causes entirely unilateral symptoms, with the point of greatest pain and tenderness in the loin external to the erector spinae, while the symptoms of osteomyelitis are central or bilateral, and the abscess when it points comes to the surface either through or internal to the erector spinae, but not outside it.

Meningitis and Landry's paralysis are only likely to be considered in those cases in which there is a rapid intraspinal spread of suppuration, and it is then that a lumbar puncture may be used. If pus be found Landry's paralysis is excluded, and the presence of staphylococci should at once lead to the diagnosis of acute bone infection, which alone can cause a primary staphylococcal meningitis. The possibility of cerebro-spinal meningitis should be definitely excluded by the limitation of symptoms to the back, and by the absence of mental changes and other signs of involvement of the cerebral meninges.

**Treatment.**—Treatment consists in (a) finding and draining the abscess, and (b) as far as possible removing the bony focus. The actual operation required necessarily varies with the individual case.

1. The simplest and most frequent procedure consists in incising and draining a pointing abscess and removing any loose fragments of necrosed bone. This has been done in 41 recorded cases, and the statistics show, as might be expected, that it is most successful where the bony focus is in some part of the neural arch. Of the 41, 23 were of this category, and 22 recovered (84 per cent.). In 15 the focus was in the body of the vertebra, and only 7 recovered (47 per cent.). In some a part of a vertebra has been found loose in the cavity and has been removed at the time of the operation. In a few a subsequent operation has been necessary for the removal of a sequestrum. The operation may be regarded as the routine treatment for osteomyelitis of the neural arch.

2. More elaborate treatment has only been undertaken in 14 cases, where bone has been freely removed in order to drain an extrapleural or extradural abscess, or to remove an extensively diseased portion of a vertebra. The results have been encouraging, for 11 of these 14 cases recovered (78 per cent.), and it must be borne in mind that they were severe cases where the total mortality is high. Laminectomy has been reported seven times; for extradural suppuration, and in 5 cases (Hunt,<sup>3</sup> Donati,<sup>4</sup> Morian,<sup>5</sup> Riese<sup>10</sup>) has been successful. Costo-transversectomy has been successfully performed once to drain an extrapleural abscess (Israel<sup>11</sup>). In the present case it was certainly entirely unsuccessful in establishing free drainage, and arresting the course of the disease. But the autopsy showed that the failure was due to the wide diffusion of the pus into the

posterior muscles and round the theca, and the result is therefore a condemnation not of the operation but of the delay in operating. The figures quoted offer the hope that the present high mortality might be materially reduced if the disease could be recognised and treated at an earlier stage.

I am indebted to Deputy Surgeon-General V. G. Thorpe, R.N., and Fleet-Surgeon R. St. G. Bond, R.N., for permission to publish the case.

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## THE CLOSURE OF COLOTOMY OPENINGS PERFORMED FOR WOUNDS OF THE RECTUM.

BY P. LOCKHART-MUMMERY, F.R.C.S. ENG.,

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A TEMPORARY colotomy—that is to say, one which is not intended to be permanent—is a rare condition in civilian practice, and consequently the operation for closing such openings is not often performed. But with the commencement of the present war it was quite early recognised by those surgeons treating cases at the Front that bowel wounds involving the rectum or pelvic colon could only be treated satisfactorily by the immediate performance of a temporary colotomy, so as to deflect the faecal contents and enable the wound to be treated without faecal contamination. Quite a large number of such injuries treated by temporary colotomy are now to be found in the military hospitals; in one week alone I have personally seen three patients who have been sent over from the Front with temporary colotomies due to wounds involving the rectum. It is obvious that an operation for the closing of the colotomy opening will be necessary in all these cases before the patient can be said to have completely recovered from his wound or to be again fit for service, and there are probably very few of the cases in which this will not be possible. As a surgeon to St. Mark's Hospital I have probably had an exceptional experience of such cases, for I have frequently operated for the closure of a colotomy, and it seems to me that the present is a good time to place on record my experience, as it may prove of some value now that a number of such operations will have to be performed.

In my book, "Diseases of the Colon," published in 1910, several pages were devoted to this subject, but my experience since has led me somewhat to modify the views there expressed. It is unfortunate that the operation for closing a colotomy is by no means free from risk. The following table, which is taken from my book, shows the results in 36 cases collected from various sources previous to 1910:—

Opening closed successfully	...	...	...	...	...	16
First operation failed	...	...	...	...	...	9
Repeated operations failed	...	...	...	...	...	6
Patient died as the result of operation	...	...	...	...	...	5

It should, however, be stated at the present time, at any rate in the hands of good surgeons, the risk of failure is certainly not as great as these figures seem to show. In the last two years I have closed eight such openings at the first attempt without a failure. There are two methods available for closing a colotomy: (1) destruction of the spur with subsequent closure of the skin opening; and (2) immediate closure by resection and suture. Of these the first is the easier and by far the safer. The only objection to it is that the condition left is not quite normal, as the bowel remains attached to the abdominal wall and there is often a weak spot which may necessitate the wearing of a belt or support. The second method is attended with decided risks and should not be attempted by anyone who has not had experience of end-to-end anastomosis of the large bowel, but it has the advantage that anatomical restitution of the parts is secured. It is, of course,

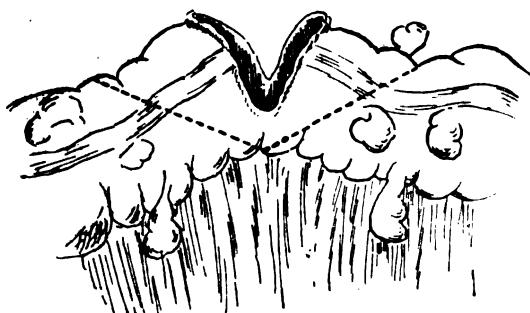
obvious that no attempt should be made to close the colotomy until the original wound in the rectum is quite soundly healed, and, in fact, it is wise to postpone the operation till all the wounds are healed, whether they communicate with the bowel or not.

#### First Method.

*By destruction of the spur.*—For this an enterotome is required. The two best forms of this instrument are one in which a male blade fits into a double female blade, the blades being made of thin steel and with a waved edge, and a second form with ribbed parallel blades in which one blade is provided with spikes which fit into holes in the opposing blade. The enterotome should be put on as follows: The first and second fingers of the surgeon's left hand are passed into the bowel, one finger in the upper and one in the lower opening, and are moved about until only the double thickness of bowel wall can be felt between the fingers. The enterotome, with the blades open, should then be passed into the bowel along the fingers with one blade in each portion of bowel, the fingers acting as guides. At least 3 to 3½ inches of the spur should be caught between the blades at the first application, and the blades should then be screwed firmly together to prevent any possibility of slipping. The spur must be completely divided for from 3 to 4 inches, rather more, in fact, than appears to be necessary. This is to allow for cicatricial contraction in the subsequent join. If possible the spur should be completely removed, so that no spur at all can be felt after the instrument is separated. This will certainly require more than one application of the enterotome. I have never known it to take less than two applications. The screw at the back end of the enterotome should be tightened up each day until it is as tight as it will go. The instrument generally causes a certain amount of pain during the first 24 hours for which, if necessary, morphia must be administered. It takes from four to five days for the instrument to become loose, and a day or two should then be allowed to elapse before applying the instrument to what is left of the spur. When the spur has been completely divided an operation should be done to close the external opening. The mucous membrane should be separated from the skin and muscles and inverted with catgut sutures, and the muscles and deep parts closed over it, also with catgut. As there is considerable risk of sepsis it is advisable to provide a drain. The drain, however, should not be placed through the original wound, but through a stab wound made 2 inches away from the primary wound. As a rule, by this method, which is comparatively safe and easy of application, primary union is secured. It will certainly fail, however, unless the spur is very thoroughly divided.

#### Second Method.

*By immediate resection.*—The two risks of this method are leakage from the line of union, which is necessarily inside the peritoneal cavity, and sepsis. It is obviously not easy



to be certain of sterilising the skin of the abdominal wall and the mucous membrane of the colotomy opening, and failure to secure this will result in peritonitis or sepsis in the wound. The bowels having been previously thoroughly cleared, the abdominal wall and the mucous membrane of the colotomy opening should be well iodined. The mucous membrane of the opening should then be carefully dissected out and closed with silk sutures. The wound should be dabbed over with iodine again and the instruments and gloves changed. The wound should then be deepened on one side until the peritoneal cavity is reached and opened. With one finger inside the abdomen the bowel should be separated from the skin all round with scissors and the loop

drawn well out of the abdominal cavity. The whole wound area should then be carefully packed off with towels or large swabs. No attempt should be made to stitch up the original opening in the colon, but the involved portion of colon should be cut out by a V-shaped resection, the apex of the V being towards the mesenteric attachment and the base containing the original opening (see illustration). It will generally not be necessary to cut through the bowel at the mesenteric attachment, but those portions opposite the mesenteric attachment should be freely cut away on both sides of the opening. It will be seen that the bowel is cut across very obliquely; this ensures a good and uniform blood-supply to the whole of the cut edge, which would not be the case if the bowel were cut transversely. It also ensures the lumen of the bowel at the point of union being, if anything, larger than the normal lumen, which compensates for any subsequent contraction of the line of suture. The two ends of the bowel are now accurately sewn together with catgut. The suture should be started on one side of the bowel and carried first across the mesenteric attachment to the opposite side and should take up all the coats. It finishes at the point where it began, and a peritoneal stitch is subsequently put over the first line of union in order to make all secure. The bowel is then dropped back into the abdominal cavity; the ragged hole in the abdominal wall, where the original hole was, is trimmed up and sewn together in layers. It is advisable to provide drainage either by means of a small tube or, better, by a piece of rubber tube an inch wide passed well down to the back of the abdomen on the outer side of the colon and drawn out through the lower end of the incision. This drain can be shortened on the second day, so that it only passes through the thickness of the abdominal wall. Drainage is necessary because *B. coli* infection in the neighbourhood of the anastomosis is very difficult to avoid with certainty, and if drainage has not been provided may cause very serious trouble. The colon bacillus is always present in large numbers in the sigmoid, whereas the small intestine contains few infective organisms; consequently drainage is not necessary when joining up the small bowel, but always advisable when dealing with the large bowel.

After this operation the bowels should be opened on the second day, either with a small enema or a dose of salts, and be kept acting daily. There is no advantage in locking up the bowels for a long time, and the dangers of subsequent trouble are much greater if the patient is once allowed to become constipated.

Hyde Park place, W.

## Clinical Notes: MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

### A NOTE ON THE USE OF "BIPP" FOLLOWING THE OPERATION OF BONE-GRAFTING.

BY H. STEWART BRANDER, M.D. ABERD.,  
CAPTAIN, R.A.M.C.

Albee's admirable and fascinating book on bone-grafting will undoubtedly be of great service to surgeons at the present time. The technique of the operation of bone-grafting rendered necessary by the character of wounds caused by modern projectiles requires careful consideration owing to the fact that in these wounds cicatricial tissue is often extensive and the blood-supply consequently poor. Seeing that one must undermine the scar tissue in order to expose the ends of the bone to be grafted, and at the same time avoid the well-known risk of re-lighting infection in a wound which has been healed for months, I venture, in order that it may possibly be of help to some other surgeons, to record my experience with the use of "Bipp" following a bone-grafting operation. This I do because, in my opinion, the strictest aseptic precautions alone, are not always sufficient. The following is a history of the case:—

Corporal, R.A.M.C., aged 26 years, wounded by shrapnel at the Lancashire landing, Gallipoli, on July 11th, 1915. Transferred to a military hospital in this country on July 27th, 1915. Patient had a compound fracture of left radius. X-ray showed radius fractured in two places—viz., about junction of middle and upper thirds and at

junction of lower and middle thirds. From the history of the case it is evident that there was much purulent discharge from the wound due to necrosed bone. The sequestrum was removed on Oct. 13th, 1915, and the wound healed about eight weeks afterwards. Patient was discharged from the Army on June 8th, 1916, as medically unfit. As a Chelsea pensioner he applied for treatment at the War Hospital, Keighley, and was admitted under my care on Nov. 13th, 1916. On admission to this hospital there was a healed scar 4 in. by 2½ in. on the extero-anterior aspect of the left forearm. The scar was very adherent to underlying structures. There was marked wrist-drop and apparently considerable loss of muscular tissue. The proximal and distal ends of the radial fracture could be readily felt at about a distance of 2 inches from each other. This was also well seen in skiagram.

Employing strict aseptic precautions, I operated on Nov. 26th, 1916. I took the graft from the tibia and followed Albee's technique throughout, except that a Hey's saw was used instead of the motor-driven circular-saw used by him. A long, curved incision was made on the front of the forearm well away from the scar. This was completely undermined and found to be adherent to the fractured ends of the radius, most of the muscular tissue in the proximity of the fracture having been destroyed either at the time patient was wounded or had subsequently sloughed. On completion of the operation the forearm was put up on a splint midway between pronation and supination. At the end of a week I dressed the wound for the first time and found that, although the skin incision had healed by first intention, part of the original scar tissue about the size of a five-shilling piece had sloughed, exposing about an inch of the graft. My first impression was that the operation was doomed to failure. Employing very strict technique according to Rutherford Morison's method, however, I "Bipped" the sloughing surface and renewed the "Bipp" every ten days, with the result that the skin wound is now (nine weeks after operation) healed and the union of the graft to radius strong. Skiagram shows the graft in excellent position.

Having had excellent results with "Bipp" in compound comminuted fractures, hernia cerebri, &c., its use after this bone-grafting operation suggested itself to me. In this connexion I wish to take the opportunity of thanking Lieutenant-Colonel Sir Berkeley Moynihan for advising and encouraging me, on one of his official visits of inspection at this hospital, to persevere with "Bipp" in the treatment of troublesome comminuted fractures; also Colonel Robert Jones for the opportunity he gave me of seeing a bone-grafting operation at the Military Orthopaedic Hospital, London.

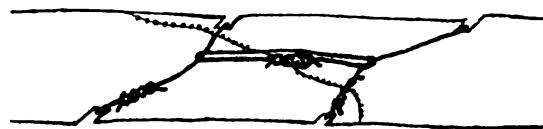
War Hospital, Keighley.

#### A NOTE ON THE SUTURING OF FRACTURED BONES BY ABSORBABLE LIGATURES.

BY KENELM H. DIGBY, M.B. LOND., F.R.C.S. ENG.,  
HO TUNG PROFESSOR OF CLINICAL SURGERY AND PROFESSOR OF ANATOMY, UNIVERSITY OF HONG-KONG.

THIS preliminary note refers to a method first worked out upon isolated bones which were specially broken for the purpose, and upon the broken limbs of cadavers. No one should attempt the method in a living patient until he has tested it for himself and practised the technique on dead bones (human or other animal). The union is not very strong, but it is claimed that, in conjunction with careful splintage, it will maintain the fragments in accurate apposition in selected cases.

The method may be illustrated by taking the instance of an oblique fracture of a long bone. After an incision has exposed the fracture two oblique cuts, at right angles to the



fracture line, are made on the surface of each fragment. These are easily made on the more exposed fragments by means of a hack-saw and on the deeper or more buried fragments by a Gigli's wire-saw. Two stout ligatures of chromicised catgut, guaranteed to resist absorption for at least 30 days are slipped into the grooves and knotted tightly. A third ligature uniting the two oblique ones is employed to tighten them still further (see diagram). It is absolutely essential that the ligatures be very tightly

drawn. For this reason the ends of the catgut must be clamped in artery forceps so that a maximum force can be used in tying the knots. The wound is then closed and the limb placed in appropriate splints.

The method has the following advantages over the use of plates and screws: (1) The operation is much more speedy and requires no special instruments; (2) no foreign body is left in the tissues such as may provoke an effusion of lymph, favouring the occurrence of sepsis, or, at a later period may set up rarefying osteitis and a permanent weakness.

#### NOTE ON THE USE OF PHYLACOGEN IN PUERPERAL SEPSIS.

BY J. H. REYNOLDS, M.B., C.M. EDIN.

THE following two cases may prove of interest to those who are so unfortunate as to run up against puerperal sepsis, and are not near enough to a laboratory to have a vaccine prepared, or cannot wait for it.

CASE 1.—Patient, aged 26, married, a strong healthy primipara. On Dec. 12th, 1913, she had been in labour some hours before I was called, and was disappointed in her nurse, but was satisfied to have the services of a friend whom I found sitting on the bed clad in a greasy old fur motor-coat. It subsequently transpired that she was waiting to go into hospital with a view to operation, the history suggesting tubal mischief. I at once borrowed the nurse from another case near by, who was perfectly satisfactory, and the confinement took place in a normal manner. Only two examinations were made, one on first seeing the patient, and the other after the liquor amnii was expelled. On the third day the pulse became more frequent, on the next the temperature started to rise, and intra-uterine douches of peroxide were given twice daily. In spite of these and other measures, the disease ran a severe course, and on the thirteenth day a clot was detached from the placental site during douching and lodged in the lower lobe of the left lung. She collapsed at once, and began to cough violently, later on bringing up bright blood and mucus. That decided me to try mixed infection phylacogen (P. D. and Co.), and I was able to inject some that afternoon. The symptoms improved with astonishing rapidity, and on the fourth day of the injections the patient was not only out of danger, but well on the way to recovery.

CASE 2.—Patient, aged 30, married, primipara. Five days before confinement, which occurred recently, her nurse brought her to me and called my attention to a mammary abscess. This was opened at once and swabbed out with chloroform. It healed before the confinement, which started with vomiting and weak pains which died away. Several small abscesses were noted on the buttocks and were painted with tr. iodi. After 24 hours the patient had a frequent and weak pulse, so she was given an injection of morphia and atropine which induced a few hours sleep; food could then be taken. The pains set in more vigorously but were not very strong, and as soon as the os was sufficiently dilated the membranes were ruptured, allowing the escape of a large amount of liquor amnii. Pains became more vigorous and the head reached the vulva, but after an hour so little progress was made that the child was delivered by forceps; its weight was 10½ lb. I had to wait three-quarters of an hour for the first pain after that, and expressed the placentae, as with the pain there was free haemorrhage. It came away entire. From the first day the temperature was elevated and well within 24 hours the lochia were offensive. Much the same treatment was followed out as in the previous case, but on the seventh day, as the temperature reached 102° F., I decided to use phylacogen again, and started injection on the following morning. After two injections all untoward symptoms ceased and on the third day the patient's condition was that of a woman who had a normal labour.

Of course, two swallows do not make a summer, but these are the only occasions on which I have needed phylacogen. The first case was losing ground till it was used, and the result was wonderful. In the second the patient, like the first, was a strong woman, but in this case I had the advantage of an excellent nurse. There is no doubt in my own mind that this was a case of primary inertia which passed into secondary. It is true that the symptoms were not nearly so severe, as she never had a rigor, although she felt very cold the day before I used the phylacogen. Still, the fact remains, as her chart shows, she made no real improvement till phylacogen was used, and I was nervous about her, because, rightly or wrongly, I looked upon the case as an infection before delivery—a condition I had never seen before.

## Medical Societies.

### HARVEIAN SOCIETY.

#### *Diagnosis in Dyspepsia.*

A MEETING of this society was held on March 1st, Dr. AMAND ROUTH being in the chair.

Dr. ROBERT HUTCHISON read a paper on Diagnosis in Dyspepsia. He defined dyspepsia as a disturbance of digestion caused by organic disease or functional disorder of the stomach. Owing to the widespread nervous connexions of the stomach and its close relations to other organs in the abdomen dyspepsia was prone to be simulated by disease elsewhere than in the stomach itself. Amongst such conditions, in which vomiting was chiefly the deceptive symptom, were pregnancy, uræmia, pulmonary tuberculosis, obstruction in the urinary passages (uro-kinetic dyspepsia) or colon, cerebral tumour, gastric crises of tabes, migraine, moveable kidney, nervous or hysterical vomiting, and, possibly, vicarious menstruation. Gastric pain might be simulated by gall-stones, angina pectoris and angina abdominalis, mucous colitis, and chronic appendicitis. Extra-abdominal causes had also to be thought of—e.g., pleurisy, spinal caries, myalgia, and herniae. Finally, air-swallowing (*eructatio nervosa*) was often mistaken for the flatulence of dyspepsia. Having eliminated the possibility of simulation, one had next to determine whether the symptoms were due to organic disease in the stomach or to perversion of its functions. If the patient complain of *severe* pain, or if there be much wasting, or if vomiting be a prominent symptom, the presumption was in favour of organic disease and of the necessity for surgical treatment. The organic diseases which have to be differentiated are: (1) ulcer, which is characterised especially by pain coming on at a definite interval after food; (2) carcinoma, in which pain is more constant and wasting and loss of appetite are prominent features; (3) stenosis of the pylorus and hour-glass stomach, in both of which vomiting is pronounced; and (4) gastritis. The differential diagnosis of these by symptoms, physical signs, and the use of special methods such as test-meals and X rays was considered in some detail. Midway between the organic diseases and functional disorders of the stomach were two conditions which partook to some extent of the character of both. These were: (1) the painful dyspepsia of young women, which is variously known as gastralgia, acute ulcer, gastric erosions, haemorrhagic gastralgia, and gastrostaxis; and (2) gastropostosis. The diagnostic features of these were described, and it was pointed out that they were not cases for surgical treatment. If simulation cases and cases of organic disease had been eliminated one might conclude that the case was one of functional dyspepsia. Further differentiation now depended upon the question of classification. Various classifications of functional dyspepsia had been suggested. One might adopt an etiological basis, dividing cases according to their supposed cause—e.g., (1) those due to physical causes, such as fatigue, unsuitable diet, defective chewing, and so on; (2) mental causes, such as over-work; and (3) moral causes, such as worry and depressing emotions. This classification, though unsatisfactory, was of some use in radical treatment. Or one might adopt a purely symptomatic division—e.g., into "flatulent," "acid," and other types. Such a basis, though often had recourse to, was apt to lead to unsatisfactory and rule-of-thumb therapeutics. The most scientific plan was to divide cases according to the nature of the disorder of function present. Now the physiological functions of the stomach are three: (1) secretory; (2) motor; (3) sensory; and any of these may theoretically be disordered in the direction either of excess or defect. Hence one got as secretory disorders hyperchlorhydria and achylia, as motor disorders atony and hypertony, and as (theoretical) sensory affections hyperesthesia and anaesthesia. These disorders might also occur in various combinations with one another, or along with organic disease. The differential diagnosis of these functional affections was then considered in detail.

## Reviews and Notices of Books.

#### *A Practice of Gynaecology.*

By HENRY JELLETT, M.D. Dub., F.R.C.P. Irel., Master, Rotunda Hospital, Dublin, &c. With 374 illustrations, many in colour, and 11 coloured plates. London: J. and A. Churchill. 1916. Pp. 618. Price 21s. net.

THE present volume represents the fourth edition of Dr. Jellett's "Short Practice of Gynaecology," which he has extended from a work written primarily for students and practitioners to one of a more advanced nature. The book has been considerably enlarged and altered in form and is a much more ambitious work than its predecessor. The text has been very largely rewritten and a large number of new illustrations added. Chapters on Radio-therapy in Gynaecology and on Vaccine Treatment in Gynaecology have been contributed respectively by Dr. Walter Stevenson and Dr. R. J. Rowlette. In view of the recent advances made in the use of X rays and radium in the treatment of various gynaecological affections the chapter on this subject is one of much interest. As Dr. Stevenson points out, the technique of the radio-therapy of deep structures has been developed to a large extent in the treatment of diseases of the uterus, and the results are such that there is a decided tendency to see if this treatment can replace the use of the knife in many gynaecological affections. He gives a clear and succinct account, free from technicalities, of the methods of using X rays, radium, and radium emanations in gynaecological cases. His description of the use of emanations is particularly interesting since this method is coming more and more into use. It has the great advantage of cheapness, emanations are supplied by an increasing number of institutions, and they can be collected in any shape or size of glass vessel suitable for the requirements of the case to be treated and without any risk of loss or permanent diminution of the value of the parent radium. The method of using emanation needles containing emanation glass capillaries, as devised by Professor Joly and the author, is described and strongly recommended; it certainly seems to have many advantages. The chapter on vaccines contributed by Dr. Rowlette contains a helpful account of this method of treatment in its relation to diseases of the pelvic organs.

The revision of the book and the choosing of new matter have been well done, and the whole forms a complete and good text-book which should be appreciated by students. In a further edition we think that the section dealing with "Atmocausis and Zestocausis" might well be omitted; these operations have never met with much favour, have been abandoned even by most of their former advocates, and if an action of this kind is desired it can be more safely and effectually obtained by the intra-uterine application of radium. The illustrations are good and a number of coloured plates have been included taken from Rudolf Jolly's "Atlas of Microscopic Diagnosis." It seems a pity that the author and publishers should have had to go abroad for these drawings.

Dr. Jellett has also written a simplified and shortened edition of the above book (*A Short Practice of Gynaecology for Medical Students*. 1917. Price 15s.). It is intended for the use of students by whom the larger book may be found too full. It has been shortened to 424 pages and contains only 316 illustrations and ten coloured plates, otherwise it is essentially the same book and requires no separate notice.

#### *Trattato dei Neoplasmi Maligni.*

Preceduto da uno Studio sulle Infezioni Chirurgiche in Generale. Di Professore D. B. RONCALI, Direttore del R. Istituto di Patologia speciale Chirurgica della R. Università di Padova. Volume Secondo. Con 133 figure nel testo e dieci tavole a colori. Torino: Unione Tipografico-Editrice Torinese. 1916. Pp. lxxix + 1040. L.34.

NEARLY six years ago we reviewed, at some length, the first volume of this work, which is now completed by the publication of the second volume. The story of malignant new growths is here treated on the same large scale to which attention was called in our review of Vol. I.; and the two volumes together form the most complete and exhaustive treatise in any language upon this very difficult subject.

This volume covers the fourth, fifth, and sixth parts of the whole work. These are : 4. Etiology of Malignant Growths. 5. Pathogenesis of Malignant Growth. 6. Therapy of Malignant Growths. Each of these subjects is dealt with very fully, and with careful criticism of all the work which has been done in relation to them from Hippocrates to 1914. Part 4 begins with an interesting account of the various views which were held as to the cause of cancer before the cell was discovered. The main part of this section is devoted to a very careful study of the various cellular theories which have been held, finishing with an account of the many parasitic theories which have been advanced since Nepveau's work in 1872.

The author, after obvious consideration, leans towards a parasitic cause; he thinks that there is a *quid vivum* of parasitic nature and foreign to the organism, and he shows in great detail that as in physiology ontogenesis is a recapitulation of phylogeny, so in pathology the genesis of cancer is a recapitulation of the genesis of inflammation. This section is the most difficult and also unsatisfactory on account of the disparity between the enormous amount of work which has been done on the etiology of cancer and the very small amount of exact knowledge we have concerning it. Part 5 deals with the predisposing causes of cancer and their modifications. Part 6 gives a very detailed account of the means at our disposal for alleviation of the symptoms, or possibly cure, of cancer. Under Therapy are included natural, prophylactic, palliative, symptomatic, and surgical therapy, and the account given is clear and quite free from prejudice. This section completes an enormous monograph, which is remarkable throughout for its accuracy of treatment, clearness and fairness, and which will be for many years valuable as the most complete résumé of our present theories and knowledge of cancer. Although the researches of the author have led him to believe in a parasitic theory of the origin of cancer, his statements and criticism of the work of others are fair and impartial, and he does not pretend to any finality in his views. He quotes the following from John Hunter in his preface : "Never ask me what I have said or what I have written ; but if you will ask me what my present opinions are, I will tell you." He has done so.

#### A Text-book of Pathology.

By W. G. MACCALLUM, Professor of Pathology in the College of Physicians and Surgeons, Columbia University, New York. London and Philadelphia : W. B. Saunders Company. 1916. Pp. 1085. Price 35s. net.

Professor MacCallum spoils an otherwise excellent book by the method in which he deals with his subject. Regarding the lesions of the human body as the different results of various forms of disturbance and injury, he divides his book into a series of chapters dealing with these different types of injury and describes various diseases as illustrations of them. The result is that a good many of the chapters contain a curious medley of subjects, such, for instance, as in Chapter XIV.—sero-fibrinous and fibrino-purulent pericarditis, pleuritis, peritonitis, appendicitis, endocarditis, lobular pneumonia, puerperal infection, pyæmia, &c.—a mixture which in a text-book becomes confusing. For a series of lectures and as a method of illustrating lectures Professor MacCallum's plan has many advantages, but it is not suitable to a text-book. As the author particularly states that the book is not intended as a book of reference, he somewhat disarms criticism. His work is, however, uneven. The subject of uræmia, for example, is dismissed in a paragraph of eight lines, and we are told that we are still in the dark concerning it. In view of the much greater emphasis given to the subject of nephritis, so cursory a treatment of uræmia is a mistake. There are much less important lesions which are treated at greater length. The paratyphoid infections are another case in point, this chapter being quite inadequate.

We do not agree with Professor MacCallum's conception of inflammation as a purely vascular phenomenon. His views on this subject are altogether too narrow, and his rigid separation of the phenomena of repair from those of inflammation is not in practice tenable. Nor does it seem correct to classify compensatory hypertrophy of a paired organ, such as the kidney, as an example of repair. The chapter on obstructions of the alimentary canal (Chapter XX.) is clumsy, again because of the author's rigid adhesion to

his method of presenting the subject. Such things as acute pancreatitis and gastric ulcer have to be dragged in as appendices in small print. The section on gastric ulcer is again inadequate, and we cannot agree that there is nothing specially characteristic about the several types of ulcer of the gastric wall.

There are 575 illustrations, many of them coloured, chiefly from drawings which are one and all excellent. We have seldom seen a better set of drawings in a text-book of pathology. They would be improved from the student's point of view if some indication of the extent of the magnification were added to the microscopical drawings. Fig. 16 is unfortunate as an illustration of intussusception associated with infarction of the intestine, for it illustrates multiple agonal or post-mortem intussusceptions in which infarction does not occur. Fig. 337 suffers from the wording of the legend which reads as though the collapse of the vertebrae causes the compression of the cord. The figure admirably illustrates the fact that it is the caseous material which causes the compression and not the bony displacement.

In the preface the author states that he has given references to literature which have been chosen so as to direct the student to readable and comprehensive papers which review the subject and give more complete references. The overwhelming preponderance of references to German literature in these lists makes them useless to the great majority of English students, at all events. Taken as a whole, however, the book is a good one, and can be recommended.

#### 1. Sanitation in War.

By Major P. S. LELEAN, C.B., R.A.M.C., Assistant Professor of Hygiene, Royal Army Medical College. Second edition. London : J. and A. Churchill. 1917. Pp. 336. Price 6s. net.

#### 2. Practical Sanitation.

By GEORGE REID, M.D. Aberd., D.P.H. Eighteenth edition. London : Charles Griffin and Co. 1916. Pp. 267. Price 6s. net.

1. THE second edition of Major Lelean's handbook has followed the first with a speed which does not justify the inveterate modesty of his preface. The "nomadic life of the service" may have prevented the author from pigeonholing his information in an office, but not from marshalling in his brain in orderly sequence all the essential facts of the great new system of sanitation which is one of the outstanding features of the Army Medical Service. The sanitary officer has turned his drawbacks into benefits, and has shown that intelligence and ingenuity brought to bear on bully-beef tins and petrol cans can result in a system of hygiene on a grand scale not always obtained by the expensive apparatus employed by our local authorities at home. The book itself has been carefully revised for the second impression, and the most notable addition is Chapter VIII., on Some New Departures in Field Sanitation, which is a collection of admirable pen-and-ink drawings with explanatory notes. Sanitation in peace, when it comes, will need to take notice of this monograph.

2. Dr. George Reid has seen 18 editions of his handbook for sanitary inspectors in the quarter of the century which has elapsed since he first published it. No recommendation is therefore necessary, but we may note that the book shows signs of careful revision. Some minor blemishes to which attention was called three years ago have been rectified.

#### JOURNALS AND MAGAZINES.

*The Annals of Tropical Medicine and Parasitology.* Vol. X., No. 4.—The first article in this number of the *Annals* is a report on the X ray examination of dysentery and other cases, by Captain C. Thurstan Holland, R.A.M.C. (T.). The author in his investigations followed the method of Glasson, described in his paper on the localisation of dysenteric ulcers by X rays, including the giving of large doses of bismuth subnitrate for at least six days beforehand. The results, however, showed nothing which might not equally well have been seen on plates taken in similar circumstances from persons not suffering from dysentery. Captain Thurstan Holland observes that "in ulcer of the stomach bismuth does not adhere to the raw surface of the ulcer, and the X ray diagnosis of gastric or duodenal ulcer cannot be made from this point of view" and he adds, "the question immediately suggests itself, Why, when it is proved

beyond any question that bismuth does not adhere to the surface of gastric or duodenal ulcers, should it adhere to ulcers in the lower bowel?" An interesting joint contribution comes next, supplied by Mr. A. Malins Smith and Mr. J. R. Mathews, on the intestinal protozoa of non-dysenteric cases. These observers, while working at the Liverpool School of Tropical Medicine on the protozoa of patients suffering from dysentery, had opportunities of examining, for the presence of protozoa, 250 patients who had entered hospital with illnesses other than dysentery. Of these 75, or 30 per cent., had protozoal infections; 20 had *Entamoeba histolytica*, either alone or along with one or more other infections; 48 had *E. coli*; 20 *Giardia (Lamblia) intestinalis*; 5 *Chilomastix (Tetramitus) mesnili*; and 4 *Trichomonas hominis*. It is, the authors say, significant that 8 per cent. of a mixed population of non-dysenteric cases should be carriers of *E. histolytica*; and it is still more significant when it is considered that more than half of the 250 patients examined had never been out of strictly temperate regions and therefore presumably had not been exposed to the infection of amoebic dysentery, or only exposed in the very smallest degree. Of the 250 patients 123 had been in tropical or subtropical countries. If only those are considered who had been in districts where *E. histolytica* was prevalent, the percentage of carriers of amoebic dysentery among them was 15.4. That this high percentage of positive cases should exist among those who had been exposed to infection and who were not suffering from dysentery is perhaps the most striking result of their investigations. Of the 20 patients who had *E. histolytica* in their stools, 3 had a history of dysentery, while 17 had no such history; these latter are what is termed "contact carriers." The authors believe that no such large number of contact carriers has previously been reported.—Mr. Henry F. Carter, lecturer on entomology in the Liverpool School of Tropical Medicine, contributes Some Remarks on the Spirochaetes occurring in the Faeces of Dysenteric Patients. Of 554 patients admitted to hospital for dysentery or related disease, 313, or 56.5 per cent., showed spirochaetes. He examined the stools of 100 other patients free from pathogenic amoebæ, 41 of whom were shown to be infected by spirochaetes. From these results he concludes that spirochaetal infections of the alimentary canal are almost, if not quite, as prevalent in non-dysenteric as in dysenteric cases.—A Preliminary Statement on the Treatment of Entamoeba Infections by "Alcresta Ipecac," is contributed conjointly by Professor J. W. W. Stephens and Dr. Doria L. Mackinnon, protozoologist to the First Western General Hospital, Liverpool. "Alcresta ipecac," it appears, is the trade name for an absorption compound of ipecacuanha alkaloids with hydrated aluminium silicate; it is made up in tablets, each containing 10 grains of "Rio ipecac," U.S.P. It is claimed that alcresta ipecac passes through the stomach unchanged and liberates alkaloids in the alkaline intestinal secretions, and that patients taking it suffer little, if at all, from the nausea and sickness that are so unpleasant a feature of some other forms of emetic treatment. The majority of the patients responded well to the treatment, and after being subjected to a pretty severe microscopical test were discharged from hospital as cured. The results on the whole compare favourably with those obtained by hypodermic injections of emetine hydrochloride.—The next paper is a first report on the protozoal findings in 910 cases of dysentery examined at the Liverpool School of Tropical Medicine from May to September, 1916, and is furnished jointly by four contributors—viz. Mr. H. F. Carter, Dr. Doria Mackinnon, Mr. J. R. Mathews, and Mr. Malins Smith. Of the 910 patients, 410, or 44.2 per cent., showed protozoal infections either alone or in mixed forms. 91 had *E. histolytica*, and 169 had *Giardia intestinalis*. The other infections noted included *E. coli*, *T. intestinalis*, and *C. mesnili*. The authors make a comparison of their results with those of previous investigators on the subject.—Dr. A. Breinl and Dr. H. Prie-tley, of the Australian Institute of Tropical Medicine, supply a Note on the "Arnhem Count" in Healthy Aboriginal Children of Northern Australia, in continuation of previous investigation. The authors believe that the results of the "Arnhem Counts" of Northern Australian native children living in a healthy district form a link in the proof that climatic changes in the tropics can be held responsible for the

altered blood conditions of inhabitants of the tropics, and that it is not necessary to resort to endemic disease as an explanatory factor.—This number completes Vol. X. of the *Annals*, of which a table of contents is appended, with an index of authors and also a general index.

The *North American Review* for January contains a very topical article by Mr. A. Lawrence Lowell, entitled "The Year and the World," attached to which are notes on the German peace proposals, on the violations of international law which have taken place in the course of the war, and on the future financial and commercial position of the United States and our own country. Further articles on the "Position of America in the Trade of the World," on "Italy's Relation to the War," on the "Food Situation in Austria-Hungary," and on the significance behind the construction and activity of the present British Government form a valuable commentary on important phases of the existing international position. A brief article, also by Mr. Lowell, entitled "A League to Enforce Peace," concludes with the following warning to the American people:—

There is no use in seeking to minimise the obligations that our nation would undertake; but no nation, and especially no rich and powerful nation, can be wholly isolated in the world to-day. If it stands alone, it must run a risk of collision, of a struggle with a dangerous antagonist, perhaps more than one enemy, and perhaps alone. Our people must seriously consider whether the security against war is not worth the cost of the insurance, and whether we should not be wise, whether we have not some duty, to take part in the policing of the world. Such an opportunity as will be presented at the close of this war is not likely to come again.

## Reports and Analytical Records FROM THE LANCET LABORATORY.

### VITAMOGEN.

(WILLIAMS AND CO., 24, HOLBORN, LONDON, E.C.)

We have already reported upon this preparation in our analytical columns, but we understand that it is now produced at a lower temperature with the object of securing an increased activity of the vitamins present. This is so far confirmed by our recent examination, since the preparation gave a very marked response for active enzymes. This shows that the temperature used in the course of preparation has been controlled at a point above which their activity is likely to suffer. Vitamogen yielded a small quantity of basic substance when extracted with 90 per cent. alcohol. The microscope showed the presence of pulse and cereal starches. The following analysis which we have made shows, apart from vitamins, that the preparation contains all classes of food substance: Moisture, 7.00 per cent.; mineral matter, 7.50 per cent. (equal to 2.50 per cent. phosphoric acid); protein, 24.96 per cent.; sugar, 20.83 per cent.; starch, 26.25 per cent.; fat, 1.51 per cent.; cellulose or fibre, 11.95 per cent. The preparation is largely soluble in cold water, the total soluble matters amounting to 62.80 per cent. The vitamins, of course, belong to a group of basic substances, but vitamogen also contains, as will be seen from the analysis, a rich proportion of phosphoric acid, derived partly from mineral salts and partly from organic phosphorus compounds.

### (1) ALBULACTIN; (2) CYSTOPURIN.

(THE BRITISH PURCHASERS OF THE SANATOGEN COMPANY,  
CHENIES-STREET, LONDON, W.C.)

Both these products are stated now to be British-made. According to our examination, they are, at all events, identical in composition with the products formerly reported upon in our columns—albulactin in THE LANCET of Jan. 7th, 1911, and cystopurin in THE LANCET of Oct. 11th, 1913. 1. Albulactin is a white, decidedly alkaline powder which swells into a gummy mass when treated with water. It represents the albumin of milk, which occurs in a larger proportion in human milk than in cows' milk, and the suggestion is that the addition of albulactin in cows' milk suitably treated has decided advantages in infant feeding, and a certain amount of evidence is brought forward on this point. On acidification albulactin does not produce a curd,

but a milky, uniform, finely divided deposit. Our analysis gave the following results: moisture, 12.80 per cent.; mineral matter, 3.20 per cent.; protein, 84.00 per cent. The preparation gives a much more marked reaction for sulphur than does casein, which serves to distinguish to some extent milk albumin from milk protein. 2. Cystopurin is a simple combination of hexamethylenetetramine with sodium acetate, which has been used in bacterial affections of the urinary tract. Apart from its antiseptic action, it also acts as a diuretic, while the presence of sodium acetate is calculated to induce an alkaline condition. There are differences of opinion as to whether hexamine should be administered under conditions favouring an acid urine or, on the other hand, an alkaline one.

#### AMBRINE.

(THE ANGLO-FRENCH DRUG CO., LIMITED, GAMAGE BUILDING, HOLBORN, LONDON, E.C.)

We have had an opportunity of examining ambrane, and it consists chiefly of paraffin wax, while it shows a small saponifiable value. The addition of oleum succini (oil of amber) is declared. The latter has some reputation as a local application in rheumatism. The main thing, however, in ambrane is the paraffin wax, which has been used considerably lately in the dressing of burns. This preparation is well adapted for the purpose owing to its purity and constant melting-point. It is supplied in the form of a cake of a light chocolate colour, which measures in length 6 inches and in width 4 inches, and about two-thirds of an inch thick. According to tests we have made, it has a melting-point of 122° F., which renders its application convenient. A full account of the use of ambrane in the Navy will be found in THE LANCET of Feb. 3rd, 1917, p. 201. Sir Arthur May, the Medical Director-General of the Navy, has arranged that every ship in the Navy, where burns are so frequent and serious a form of injury, shall be equipped with an outfit for their treatment by paraffin wax.

## THE CONTROL OF VENEREAL DISEASES.

### *War, Venereal Disease, and Workers' Insurance in Germany.*

Dr. Kaufmann,<sup>1</sup> President of the German Government Insurance Department (Reichsversicherungsaamt), has collected the experiences of the past years, including the first period of the war, gained by the German empire in its dealings with venereal disease and insurance. The campaign against venereal disease in Germany has been so speeded up by the emergencies of the war that, brief as is the period with which this book deals, an immense amount of work done, and of schemes for the future after the war, come under consideration. Dr. Kaufmann gives some interesting figures. For the past 20 years the frequency of venereal disease in the German army has shown a steady decline, which continued even during the first year of the war. In this year the incidence of venereal disease was only 14.4 per 1000, as compared with 137 in 1895. It seems to have come as a surprise to the Germans that their armies in the fighting-line were less subject to venereal disease than the forces stationed within Germany's own frontiers. Indeed, the difference between the incidence of venereal disease in the armies at home and abroad seems to be remarkably great. Hence the necessity for that vigorous campaign against venereal disease throughout Germany inaugurated, apparently, by the temporary administrator of Belgium, von Bissing. Dr. Kaufmann describes the conduct of this campaign, the machinery and organisation of which are those of the Workers' Insurance. This organisation, which has done so much to suppress alcoholism and tuberculosis, has begun to establish dispensaries for the subjects of venereal disease, including not only the discharged soldier, but every insured person in Germany. The author touches on the delicate subject of specialist *versus* general practitioner in connexion with treatment, and emphasises the importance of expert treatment. He also discusses the problems associated with the quack, whose activities in tinkering with the disease and blackmailing its victims are notorious, notably in Southern Germany.

<sup>1</sup> Krieg, Geschlechtskrankheiten, und Arbeiterversicherung. (Published by F. Vahlen. Price M.2.)

### Council Schemes.

Dr. Charles Templeman, medical officer of health of Dundee, has drawn up a scheme for that city, suggesting co-operation with the neighbouring authorities. He proposes that the town council shall come to an arrangement with the laboratory at the infirmary or the University College, and use the out-patient department of the infirmary as the treatment centre. The infirmary directors were willing to provide eight beds at a weekly cost of 35s. per bed.—At Leicester special medical officers, male and female, have been appointed for the treatment centre at the out-patient department of the Royal Infirmary, with attendance two days a week. A local branch of the National Council for Combating Venereal Diseases has been formed, of which Dr. C. K. Millard, medical officer of health of Leicester, is one of the honorary secretaries.

### *Notification of Venereal Diseases.*

Writing on the campaign against venereal diseases in this country in the *Münch. med. Wochenschr.* of Jan. 11th Dr. A. Blaschko, who contributed a report to our Royal Commission on Venereal Diseases, states that in well-informed circles in Germany, as in England, compulsory notification is not considered an advisable measure at present. He mentions the drastic proposals of the Munich Medical Society,<sup>2</sup> only to condemn them, adding that they are in such flagrant contradiction with the experience of daily practice as to be certain to meet with opposition from those possessing practical knowledge.

### *Early Preventive Treatment.*

Mr. Stanley R. Tattersall, a ship's medical officer, writes:—

For some months past I have been issuing packages containing one tube of mercurial ointment and one of an organic silver preparation. The appreciation given to these packages has not been encouraging. The majority of men do not go ashore with the conscious intention of sexual indulgence, the desire being rather proportional to the amount of alcohol consumed. When sexual desire becomes urgent they have either forgotten about the package or are too lazy to use it. Even the exceptions do not show inclination to apply for the outfit, though this is issued gratuitously. The demand at Dr. Rentoul's price<sup>3</sup> of 5s. would be nil. Slot machines would, in the present state of public opinion, make their customers unpleasantly conspicuous. The best preventive is probably "information." Some time ago I lectured on venereal diseases to all men under my care. For seven months afterwards no case of the kind occurred on board.

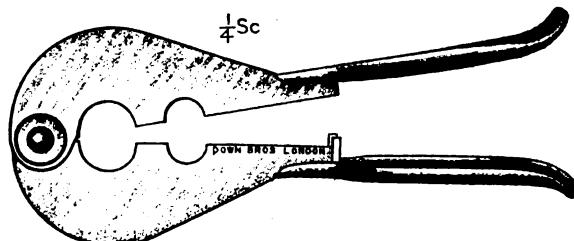
<sup>2</sup> THE LANCET, 1916, II., 1068.

<sup>3</sup> THE LANCET, Feb. 3rd.

## New Inventions.

### AN AMPUTATION RETRACTOR.

I DESIRE to bring to the notice of surgeons, and particularly those who may be handicapped by lack of assistance in the matter of amputations, a simple little instrument (see illustration) which obviates the necessity of a second pair of hands during any amputation. It is intended to hold back the flaps while cutting through bone, and to those who, like myself,



have been repeatedly called on during this war to perform amputations single-handed and with despatch, I feel sure the instrument will appeal, and once used will prove its value and indeed justify its right to a place in every properly equipped theatre.

The instrument has been made for me by Messrs. Down Bros., St. Thomas's-street, S.E.

COLLINGWOOD FENWICK, M.D.,  
late Surgeon-Major Armée Française.

# THE LANCET.

LONDON: SATURDAY, MARCH 10, 1917.

## The Mobilisation of the Medical Profession: the Position of Dentistry.

THE necessity of providing an adequate medical service for our ever-increasing armies still presses upon the professional committees whose duty it is to assist the War Office in this direction. It has been evident for some time that all the medical men who are prepared to take a temporary commission with alacrity, or who can accept such a commission without serious disregard of the pecuniary side of the matter, are already with the colours; the work of the Central Medical War Committee is growing very delicate, as the claims for exemption are seen more clearly to be based upon individual difficulty of circumstance or upon general shortage of medical men in the neighbourhood. As we state elsewhere, the Central Medical War Committee and the Committee of Reference of the English Royal Colleges have now selected their representatives for the Conference appointed at the instance of the Director-General of National Service, and it is generally expected in the medical profession that the deliberations which will ensue ought to settle promptly some of the difficulties which at present surround the mobilisation of the medical profession. Sir DONALD MACALISTER, who is to act as chairman of the Conference, will find himself in a position that will give full play to his genius for management.

It is possible that in the near future the same necessity for dealing economically with man power will arise with regard to the dental profession, as there is no question about the great importance of skilled dental aid in assisting to maintain the health of the community. We feel quite sure that the dental profession, if called upon, will freely and willingly adapt itself to any conditions which those in authority may consider necessary. The British Dental Association, with a view to the possibility of the mobilisation of dentists, has already taken steps to obtain all available information and statistics, which will be forthcoming when the call is made. The best manner in which to utilise the dentists will require careful consideration, for the number of qualified practitioners is strictly limited. Approximately there are 5000 dentists on the Register for a population of 40 millions. Of these about 2300 are of military age, and it is calculated that at the present time 1000 are serving the country either in the Royal Army Medical Corps, as dental surgeons to the Navy or Army, or as combatants. The number of dentists available for the civilian population is therefore some 4000, and if those of military age are called up, only 2700 will remain, a number

totally inadequate for the needs of the community. Before the war the harmful effect of dental disease on the public health was appreciated by the medical and dental professions, but the condition of the teeth of the soldiers has drawn public attention to the question and the nation is beginning to realise the value of healthy teeth. The importance, then, of an adequate supply of dentists for the needs of the nation must be kept clearly in view by the Government authorities.

How best can the supply of qualified dental surgeons be utilised? In the first place, it would seem advisable to create a Central Dental Committee to work in co-operation with the Central Medical War Committee. The dentists should be enrolled in a similar manner to that which has been adopted with medical men. Those of military age, if not required for the dental needs of the Army, should not be taken as combatants, but should be used for dental service as the fittest occasions arise. For instance, the manufacture of munitions has created large communities in districts previously but sparsely populated, and in such cases arrangements might be made for a supply of qualified men. The depletion of our dental hospitals of adequate staffs must be avoided, for these institutions are a public necessity, and already work has been curtailed owing to the shortage of students. In the case of dental practitioners, with some years of general hospital experience, more use should be made of their services in connexion with the treatment of gunshot injuries of the jaw and the diagnosis of cases where dental disease is suspected as a factor in the general condition.

## The Sphere and Future of Midwives.

AT a recent meeting of the Incorporated Midwives' Institute resolutions were passed upon matters affecting the employment of midwives of considerable interest to medical men. One of these resolutions contained an expression of strong opposition to the enforced notification of pregnancy as being likely to prevent the early engagement of a medical man or midwife to attend an expectant mother. Another resolution affirmed the belief that the midwife is the proper person to give antenatal care, because under the rules of the Central Midwives Board she is "responsible for the patient from the time of booking." The difficulty of providing effectively for antenatal care upon a large scale by employing exclusively for its administration the trained women who seek admission to the Midwives Roll at the hands of the Central Midwives Board was suggested by a third resolution, which contained a request that the Council of the Incorporated Midwives' Institute should endeavour "to discourage the depletion of the ranks of the midwifery profession, due to midwives taking up the less arduous and better paid work of health visitors." The same far-reaching resolution affirmed the desirability of educating public opinion as to the importance of adequate attendance at childbirth, "which can

only be attained by improving the status of the midwife and ensuring that she is sufficiently paid." To what source those responsible for this resolution were looking for an increase of the midwife's earnings was not revealed, and there may have been reason behind this reticence.

But if the introduction of infants into the world under conditions which will prevent wastage of life is to be attended with fewer elements of risk and less disappointing results, it is clear that the pecuniary side of the situation must be faced. At the present time the saving of infant lives has been rendered doubly valuable to the State by the occurrence of a devastating war, but the same cause has rendered the obtaining of money for public purposes more difficult than usual. Arrangements which might have been made whereby more adequate fees were received by medical men or midwives attending women in labour, and by those entrusted with their antenatal care, are now much more difficult to contemplate, and yet all public authorities would be well advised to consider them. The National Insurance Acts possess the necessary machinery through which the cost of the increased care of both mother and infant at the time of childbirth, and before and after the event, might be met, but the Commissioners cannot be expected to welcome any proposals for increased expenditure, and only the national nature of such a call upon their funds would be likely to move them. It would not be fair or reasonable, however, to subsidise the midwife, by the means suggested or by any other, to the exclusion of the medical practitioner. The fact that the working classes in many instances cannot pay adequate fees for attendance in childbirth affects medical men and midwives alike, and assistance in the one instance and not in the other would be unjust, though this is a view which the public will not necessarily appreciate. And here with regard to the education of public opinion a point suggests itself as worthy of consideration. The reports of the deliberations of the Central Midwives Board, which we publish from time to time, show that the Board has constantly to summon before it for disciplinary purposes women who have failed to obey its regulations in matters affecting the safety of their patients. The majority of these cases, it may be noted, fall under three headings: either the midwives have failed to recognise symptoms, or they have not advised that a medical man should be called in, or they have neglected prescribed precautions of cleanliness. In what proportion do these things apply to the two classes of midwives now practising—i.e., to those who were admitted to registration because they were practising before the Act came into force, or to those who have since been admitted after passing the tests of training and capacity which the Central Midwives Board imposes? In a recent pamphlet published by the Women's Industrial Council Miss J. F. MACKINTOSH states that during the past year of 102 penal cases in only 32 were the midwives certified, and of the 62 women removed from the Roll "far the larger proportion" were practising before the passage of the Midwives Act.

In a lecture recently delivered at the Royal Institute of Public Health on the rôle of the midwife and the protection of motherhood, the lecturer, Lady BARRETT, M.D., referred to the unsettled relationship, in their respective spheres of influence, of the midwife and the trained health worker; through a want of clear definition of their individual duties some misunderstanding has unfortunately arisen between these two indispensable classes of women. The midwife, owing to her long and undisputed jurisdiction over the destinies of the new-born baby, not unnaturally resents any suspected interference with her prerogatives. On the other hand, many of the highly trained and enthusiastic women who have been appointed as health visitors, and attached to the Public Health Service, may have gone beyond their legitimate provinces in repairing what they have considered the loss of golden opportunity on the part of the midwives. There can be no doubt that neither doctors nor midwives have sufficiently taken into account in the past the vast importance of prophylactic measures in the care of the pregnant woman. Lady BARRETT pointed out that the work of midwives and health visitors is for the most part distinct; it may overlap occasionally when the resulting difficulties must be overcome by tact and a little give-and-take on each side. The midwife, she said, should not resent the visits of a health visitor to the home during pregnancy any more than should a doctor, and the same tolerance should be extended to visits after the midwife has given up the case. A wise health visitor will not give advice to a mother regarding her personal health when the mother is already in the professional hands of a doctor and in receipt of those ministrations that according to the Act are expected from a qualified midwife. She can well occupy herself with matters of sanitation, housing conditions, and social economy. For the moment there appears to be some real difficulty in arranging the special niches which the health visitors and the midwives are to fill in those extremely useful institutions called antenatal clinics. In these there is undoubtedly work for both, but without whole-hearted co-operation between all concerned, including the parents, they cannot fulfil their possibilities for good. The future of the calling of the midwife requires close attention; it is endangered not only by some factors which the midwives can themselves control, but by others where they require the sympathetic assistance of the public, the medical profession, and welfare workers.

ROYAL SOCIETY OF MEDICINE.—At the Section of Electro-Therapeutics on Friday, March 16th, at 8.30 P.M., an address will be given by Professor W. M. Bayliss, F.R.S., on "The Origin of the Electric Currents Led Off from the Human Body."

ARMENIAN RED CROSS AND REFUGEE FUND.—The second annual report of this fund shows a record of useful work. During the year 1916 £4146 was collected and £5000 spent in the relief of the Armenian sufferers from the war. In addition to the provision of food, clothing, and medical necessities, an orphéauge has been built at Alexandrapol, the expenses of which are 1000 roubles per month. The address of the honorary secretary is 35a, Elstam-road, Kensington, W., and the bankers are London and South-Western Bank, Holland Park branch.

## Annotations.

"Ne quid nimis."

### RECENT WORK ON CEREBRO-SPINAL FEVER.

In the recently published fasciculus of the *Times History of the War*,<sup>1</sup> among other subjects dealt with is the epidemic of cerebro-spinal fever which early in 1915 gravely threatened the troops in training throughout the British Isles. The latest account states that in January, 1915, the Director-General of the Army Medical Services invited the Medical Research Committee to come to his assistance, and that immediately after this a plan of campaign was drawn up. This account is not quite accurate, for it ignores the valuable work that was done by Colonel W. H. Horrocks, C.B., A.M.S., Adviser on Sanitation to the Army Council, and by Surgeon-Colonel R. J. Reece, H.A.C., assistant medical officer to the Local Government Board, who from the time that cerebro-spinal fever was made compulsorily notifiable in September, 1912, had been watching the behaviour of the disease among the civil population. These two experts were asked by the Director-General to prepare a scheme for administering measures for the prevention and control of cerebro-spinal fever among the troops. For this purpose Surgeon-Colonel Reece was seconded by Sir Alfred Keogh from his regiment to devote his whole time to supervise the arrangements. A full account of this pioneer work was published in the *Journal of the Royal Army Medical Corps* in June, 1915. The scheme, which is still in operation, has proved very successful. The various Army Commands in England, Wales, Scotland, and Ireland were divided into suitable areas, in each of which a laboratory under a skilled bacteriologist was established, and, in addition, a special record-keeper was appointed in each area to make out lists of persons attacked and to obtain accurate information as to the sanitary environment, &c., in every case as it occurred. Both the district bacteriologists and the record-keepers made periodical reports to the War Office. At an early stage the newly established laboratories in England and Wales were inspected by Surgeon-Colonel Reece, who also at the same time instructed the district officers in their duties in connexion with cerebro-spinal fever. A part of the original scheme was the appointment of a skilled bacteriologist whose services would be available as a consultant, and to undertake research work, as the characters of the disease were not yet thoroughly known. The carrying out of this portion of the scheme was made possible by the Medical Research Committee agreeing to defray the cost of the consultant, who should give his whole time to the work. Dr. Mervyn Gordon, assistant pathologist to St. Bartholomew's Hospital, who had previously done admirable work in connexion with the bacteriology of cerebro-spinal fever for the Local Government Board, was appointed to the post, receiving the honorary rank of Major in the Royal Army Medical Corps. A central laboratory was established at the Royal Army Medical College, Millbank, and later, when the work had greatly increased, Dr. T. G. M. Hine was appointed assistant bacteriologist, with the honorary rank of Captain. The value of the services of these two expert bacteriologists has already been recognised by the Army Council, and Major Mervyn Gordon has been promoted to

honorary Lieutenant-Colonel and Captain Hine to honorary Major. In elucidating the various scientific problems associated with cerebro-spinal fever the Medical Research Committee had the co-operation, and assistance also, of several expert bacteriologists in various parts of Great Britain. The details of the bacteriological operations of the central laboratory are described correctly in the excellent narrative given in the *Times History of the War*.

### THE DIET OF THE BRAIN-WORKER.

THE amount of fuel required in the economy of the man whose employment entails bodily exercise in greater or less degree has been fully discussed during the last few months, but the brain-worker still remains in doubt as to the minimum intake of food which he requires. The text-books have so far contented themselves with pointing out that brain-work, of whatever grade of intensity, is associated with a scarcely measurable increase in metabolism. Professor W. M. Bayliss, in a course of lectures delivered last autumn at University College, London, and now forming the basis of a useful little manual,<sup>1</sup> comes to the rescue of the brain-worker and suggests that there is another consideration besides the actual quantity of energy developed by mental activity which should be taken into account. The oxygen consumed by any organ is an index of the food required by that organ. Experimental results prove that, although the actual consumption of oxygen in the nerve centres is not great, it has to be supplied at a high pressure. This is shown by the fact that even momentary stoppage of the food-supply causes immediate unconsciousness, although the oxygen of the blood still remaining in the brain cannot have been exhausted. Professor Bayliss suggests the analogy of an electro-magnet wound with thin wire which does not need much current to actuate it, but which, owing to the high resistance of the wire, requires a high voltage to drive the current through. It is, at any rate, possible that efficient mental work may require food to be presented at high pressure, and that a brain-worker should take a diet of energy value equivalent to that of moderate muscular work. The question deserves further consideration.

### TWO SIGNS OF THYROID ABSCESS.

THYROID abscess is usually considered a very rare condition. However, in the *Boston Medical and Surgical Journal* of Jan. 18th Dr. F. H. Lahey has reported three cases which he has seen within a few months among a large number of thyroid cases coming under his observation. He has also pointed out two signs which do not appear to have previously received attention—viz., limitation of chin elevation and depression of the chin on the sternum when swallowing. In two of the cases there was a history of tonsillitis and in the other the abscess appeared during recovery from bronchopneumonia. One case was sent to the hospital as a cyst of the thyroid, and had practically every appearance of that condition, as well as the two signs mentioned. In all the cases there was a tender swelling across the neck and corresponding, for the most part, to the outline of the thyroid gland. In one case there was some redness of the skin over the swelling. In the other two the skin was normal. There was fluctuation in all the cases,

although it was not easy to appreciate, as pus here is overlain by two sets of muscles. Dr. Lahey regards his two new signs as important in cases suspected of thyroid abscess. They are brought about by the action of the sterno-hyoid, sterno-thyroid, and omo-hyoid muscles on the abscess beneath them. The pain would result from tightening of these muscles. Tightening in swallowing would be prevented by depression of the chin upon the sternum. Elevation of the chin would stretch these muscles, causing pressure on the abscess and pain. Depression of the chin upon the chest is the natural position then for the patients to assume in swallowing. The treatment is simple—incision and drainage. It is important, however, to dissect carefully down to the gland, under local anaesthesia, and to cut the fibres of the sterno-hyoid transversely for a short distance on each side of the median line, as the longitudinal tension of the sterno-hyoid and sterno thyroid produces a tendency for any other incision to come together, thus interfering with drainage. On establishing drainage in these three cases recovery was rapid and uneventful.

#### THE TUBERCULOSIS PROBLEM.

IN his recent address at the Royal Institute of Public Health Dr. T. D. Lister dealt with the tuberculosis problem as it has been altered by conditions of war. It was desirable, he said, owing to the reduction in funds now available for what are called "complete schemes," to begin by stock-taking. He agreed with Dr. Maxwell Williamson, medical officer of health of Edinburgh, who recently stated that the whole method of tuberculosis treatment should be reversed, and the money at present spent on sanatoriums should be devoted to re-housing. As a result of his study of industrial tuberculosis, Dr. Lister had come to the conclusion, already expressed in our columns,<sup>1</sup> that the present campaign is wrongly based. The real aim should be to carry the lessons of the sanatorium into the workshop and the home. He condemned the policy laid down by the Departmental Committee as one of academic perfection, foredoomed to failure. Tuberculosis officers can be much better employed in visiting doctors than in visiting patients. The criticism and supplanting of the general practitioner that are now going on in this and other movements are a matter for regret. Dr. Lister spoke strongly, adding that one futility was being followed by another, and that the money available was being frittered away in collecting statistics for reports, instead of used to prevent the economic loss from consumption. This, he said, was the real national problem of the disease, and was known to be due to environment, the bacillus being a comparatively harmless pest to the majority of town-dwellers, who were becoming immunised. Sanarelli's views of the history of the disease in relation to industrial urbanisation were brought under review, and Dr. Lister said that all we were doing at present was to watch national immunisation overtake national infection in urbanised populations. He would place the treatment of tuberculosis entirely in the hands of the general practitioner, who should be encouraged and helped in urban areas to join in forming the staffs of properly equipped out-patient institutions for all classes of disease as well as tuberculosis.<sup>2</sup> But he held, of course, that the prevention of tuber-

closis was a matter for central administrative measures by the Local Government Board. In any area, he said, action should be taken if the deaths or notifications exceeded a figure to be called "the administrative index." This index would be a high multiple of the average incidence of mortality or of notifiable tuberculosis, a term requiring precise definition. By stating the administrative index high enough, only a few incursions of central authority would be necessary at first to destroy some of the worst hotbeds of the disease. Dr. Lister's suggestion is in effect an adaptation to chronic infection of the principles already adopted in the case, say, of a serious outbreak of typhoid or scarlet fever. It would, of course, take as many years to show its effects in tuberculosis as such methods take weeks in acute infections. But many other strongholds of disease would be affected by thus dealing with tuberculosis, the test disease of urban conditions, and both the factors of intensity of infection and of bad environment would equally come under consideration when the sole guide was an administrative index.

#### THE SUMMER TIME ACT.

THE Committee appointed by the Home Secretary to inquire into the social and economic results of the Summer Time Act of 1916 recommends the renewal of summer time for this year and in the future, the period suggested being from the second Sunday in April to the third Sunday in September. Most of the difficulties foreseen by the fearful in the application of the Act did not come to pass. The objection that hardship was involved for the very early riser on account of the reduction in his vitality in the early morning hours was submitted to the Health of Munition Workers Committee. The reply was that:—

The temperature of the human body is not constant, but is known to exhibit a distinct cycle during the 24 hours. A modification in the hours of work and rest leads to a corresponding modification in the hours of highest and lowest temperature. Thus, a party of Arctic explorers found that a complete reversal of their hours was followed within a few hours by a similar reversal of their temperature curves. The alleged curtailment of the hours of sleep for children has apparently been substantiated in certain districts, but the Committee concludes that on the whole the children benefited by summer time. The proposed earlier return to normal time in the autumn is a concession to the weaving sheds of Lancashire, in which the artificial light may raise the temperature unpleasantly in the earlier mornings of the second half of September.

#### INSANITY AND THE WAR.

THE annual report of the Royal Edinburgh Mental Hospital for the year 1916 contains some interesting remarks by the physician-superintendent, Dr. George M. Robertson, on the exceptional circumstances produced by the war and their bearing on mental institutions. For 1915 and 1916 the admissions attributable to alcohol were 7 per cent. and 7·7 per cent. respectively; the average annual percentage for the preceding seven years was 12·6 per cent. There can be no doubt, therefore, that alcoholic insanity has been decidedly less since the war began, and there is no statistical evidence in Dr. Robertson's hands that alcoholism as a cause of insanity has increased among women. It is true, of course, that increase of occasional drunkenness and of transient forms of mental disturbance of alcoholic origin may have occurred apart from the cases that come under the purview of the

<sup>1</sup> THE LANCET, 1910, II., 1122.

<sup>2</sup> THE LANCET, 1912, II., 1612.

asylum superintendent. Speaking generally, there are no signs of increase of insanity last year among the civil population. A decided fall in the number of females admitted under Dr. Robertson's care suggests that the effect of war work has been, so far, on the whole beneficial and less injurious than the semi-employed and shut-in lives that many women formerly led. Bereavement as an alleged cause of insanity has not proved itself in any way potent, probably because the blow is softened by psychological factors that can readily be imagined. A certain type of mind, however, is prone to seek consolation for its sorrows in the domain of so-called spiritualism, and Dr. Robertson sounds a wise note of warning in this connexion. He does not consider that those who are unversed in normal, and particularly in morbid, psychology are qualified investigators, and, least of all, that those who are wishing and longing for and unconsciously expecting certain manifestations from friends they may have lost make reliable observers. Accordingly, he regards the publication of "Raymond" at this time as much to be deplored. Such words from an eminent psychiatrist will, it is to be hoped, carry proportionate weight. Amateur and biased inquirers into the subject are, as a rule, quite unaware that "if they would meet those who are hearing messages from spirits every hour of the day, who are seeing forms, angelic and human, surrounding them that are invisible to ordinary persons, and who are receiving other manifestations of an equally 'occult' nature, they only require to go to a mental hospital to find them. It is true that the modern physician, by a long study of these phenomena, has come to regard them as symptoms of disease, and has renounced the doctrine of possession by spirits, though it had the double merit of simplicity and of antiquity to support it. If honest mediums do exist who hear inaudible messages, or feel communications without words, or see forms invisible to others, the mental physician accustomed to symptoms is inclined to regard their 'gifts' as being, if not morbid, at least closely related to the morbid, with no element of anything 'occult' about them."

Another annual report where the question of the war in its relation to insanity receives critical consideration is that of the Crichton Royal Institution at Dumfries. The physician-superintendent, Dr. C. C. Easterbrook, has analysed the histories of the 157 admissions of 1916, and in 19 (12 per cent.) a connexion between the two was apparent or traceable. Of these 19 patients two were women. In every one of the series the common factor of pre-existing nervous or mental instability was definitely determined to have been present. In other words, the influence of the war on these particular individuals has been to expose and accentuate their inherent weakness, whereas the normal individual is braced up and stimulated and his latent qualities of resistance are developed by the strain and stress of these times.

THE Lettsomian lectures of the Medical Society of London on "War Surgery of the Abdomen" will be delivered at 11, Chandos-street, Cavendish-square, London, W., on March 19th, 22nd, and 23rd, by Colonel Cuthbert Wallace, A.M.S. On April 2nd a discussion on "The Operative Treatment of Arterio-Venous Aneurysm," will be introduced by Colonel Charters Symonds, A.M.S., and Captain R. H. Jocelyn Swan. The time in each case is 8.30 P.M.

## NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENTS.)

### Lahore Medical College.

THE annual presentation of prizes to the students of the Lahore Medical College and Medical School was made recently by the Hon. Colonel Harold Hendley, Inspector-General of Civil Hospitals, Punjab. The report stated that the new buildings with their up-to-date theatres and class-rooms were now available and all the discomforts and difficulties of the past had come to an end. 234 and 304 students are now on the rolls of the college and school respectively as compared with 176 and 269 in 1915. The total of 538 students exceeded that of the preceding year by nearly a hundred. 103 students had been refused admission to the school owing to want of accommodation. The only remedy suggested for this hardship is the separation of the school from the college, for if the former were re-established in another city it could be so expanded as to admit all students who apply.

### The Cultivation of Medicinal Plants in India.

At the last sitting of the Calcutta session of the Industries Commission Major A. T. Gage, I.M.S., Director of the Botanical Survey of India, gave expert evidence concerning the working of his department and the correlation of its activities with those of the economic botanists in the Forest and Agricultural Departments. He said that given the necessary staff and equipment it should be quite feasible to undertake the systematic cultivation in India of any or all of the species of drug-yielding plants and also the improvement of their quality. So far as he was aware no organised attempt had yet been made to discover what drugs were in demand in India and could be cultivated with advantage. At present there were 3000 acres actually under cinchona plantation in Bengal, and he saw great possibilities for an organisation devoted to the proper development of medicinal plants in India.

### Sub-Assistant Surgeons in Conference.

The eleventh annual conference of the All-India Sub-Assistant Surgeons' Association was recently held in Madras, and was attended by representatives from Bombay, Poona, Baroda, Ahmedabad, Indore, Gwalior, Agra, Meerut, Lucknow, Calcutta, and Burma, in addition to members from the Madras Presidency. Surgeon-General W. B. Bannerman, C.S.I., was in the chair. The chairman in his presidential address said that during his long years of service in India he had learned to respect and esteem the sub-assistant surgeon as a man who had, in most cases, gained his present honourable position by hard work in adverse circumstances and who could be relied upon to help in time of need.

### New Hospital for Rangoon.

At a recent meeting, presided over by the Lieutenant Governor, it was decided to take steps to collect funds for the erection of a new general hospital to be called the Lady Chelmsford Hospital.

### Vaccination in the United Provinces.

The prejudice against vaccination is breaking down, a fact which is indicated in the report of the Sanitary Commissioner for the United Provinces. The percentage of successful vaccinations in relation to the birth-rate shows a steady rise year after year, and last year reached nearly 72. A million and a half vaccinations were performed during that year, as against a million and a quarter during 1909-10. Concurrently with the increase in the number of persons vaccinated the mortality from small-pox has declined in the United Provinces to 0.05 per 1000 of the population from 0.38 in the previous year, and 0.13 in the quinquennial average.

### Overcrowding in Simla.

The question of the overcrowding of Simla forms the subject of some pointed remarks in the report of Colonel Hendley, officiating Sanitary Commissioner of the Punjab, which has just been published. Colonel Hendley considers that it may eventually be found necessary to limit the population of Simla by levying a heavy poll-tax and so making it difficult for persons not in employment to live there.

### A Gardening Corps for the Mesopotamian Field Force.

In order to meet the inadequacy of the present supply of fresh fruit, vegetables, and garden produce for the use of the Mesopotamian Field Force the Madras War Fund has offered

to raise and equip a number of units for gardening purposes, a unit being estimated as being able to cultivate 15 acres. The General Officer Commanding in India has accepted the offer of four such units which, with any further units organised, will form the Madras Gardeners Corps and be placed under the command of a European superintendent.

## MEDICINE AND THE LAW.

### *The Need for the Criminal Law Amendment Bill.*

CASES which it should be possible to deal with more effectually when the Criminal Law Amendment Bill is passed are at the present time of frequent occurrence. Mr. Francis recently sentenced a girl, pronounced by the police to be a disseminator of contagion, and of the worst personal character, to six months' imprisonment in default of finding a surety for her good behaviour, and declared that it was the only course open to him. He passed on the same day a like sentence on another girl of the same class, and heard "an unusually large number" of cases of soliciting soldiers. On the same day Mr. Chapman had before him nine women charged with soliciting soldiers in one locality alone (Waterloo Bridge-road), as well as two more from that district one of whom had two charges of procuring made against her. Presumably all these women would have been dealt with under the new law in its original form. Of the danger there can be no doubt. Whatever views may be held as to compulsory examination in any circumstances, the existence of the emergency cannot be disputed.

### *Adoptive Public Health Measures.*

The recently-issued report of the Local Government Board for Ireland contains instructive evidence of the limited amount of advantage to be derived from measures connected with the public health when they are made adoptive instead of compulsory. The notification of tuberculosis under the Tuberculosis Prevention (Ireland) Act, 1908, is stated to have made steady progress, and to extend to 79 sanitary districts. These, however, can only be described as containing "over a third" of the population of Ireland. Nevertheless, so far as the experiment has gone, it seems to be regarded as successful, some local bodies having passed resolutions in favour of its universal adoption. The Notification of Births Act, 1907, has now been made general by the Extension Act passed in 1915. Under the adoptive system Belfast county borough and Dublin county borough were the only two districts in Ireland in which the Act was put into operation. As it is observed in the report that infant mortality in urban districts in Ireland is considerable and "affords ample scope for a substantial reduction," the experiment now being tried upon a large scale should supply interesting results.

### *Criminal Lunatics and Broadmoor Asylum.*

In the House of Commons recently Mr. T. M. Healy, K.C., asked the Home Secretary a series of questions regarding the detention of Irish criminal lunatics. The reply elicited was to the effect that in several instances men charged with criminal offences out of Great Britain and found by the court to be insane are confined in an asylum in England, including at least one who was tried in Ireland, and that the authority for the practice was the Criminal Lunatic Asylum Act, 1860. It was added that the matter was one of convenience and that Broadmoor was a regular prison for the purpose. The statute referred to by Sir George Cave in his answer to Mr. Healy is known as the Broadmoor Act, as well as by the title quoted above. It enables the Crown to appoint any asylum or suitable place in England to be an asylum for criminal lunatics, but Broadmoor is the only asylum which has been so appointed. Under Section 2 of this Act a Secretary of State may direct to be conveyed to, and kept in, such an asylum any person for whose safe custody during its pleasure the Crown is authorised to give order, or any person coming within the terms of that section. Under other Acts (14 and 15 Vict., C. 81; 47 and 48 Vict., C. 31) criminal lunatics in India who are European British subjects, and criminal lunatics in other British possessions where they cannot conveniently be confined or suitably treated are removable to England, and may be committed to Broadmoor.

## THE SERVICES.

### ARMY MEDICAL SERVICES.

#### TERRITORIAL FORCE.

Lieut.-Col. A. M. McIntosh to be temporary Colonel whilst holding the appointment of Assistant Director of Medical Services.

### ROYAL ARMY MEDICAL CORPS.

L. C. Bruce (Captain, R.A.M.C., T.F.) to be temporary Major whilst employed at the Military War Hospital.

Capt. A. T. J. McCrea to be local Major whilst employed on embarkation duties.

A. de W. Snowden to be temporary honorary Major whilst serving with the British Red Cross Hospital, Netley.

To be temporary Captains: Temp. Lieuts. F. W. Lyle and R. C. L. Batchelor.

Temp. Hon. Major C. H. Miller, having ceased to be employed with the British Red Cross Hospital, Netley, relinquishes his commission.

Temp. Capt. F. G. Heard relinquishes his commission on account of ill health.

Temporary Lieutenants relinquishing their commissions: A. Neville, M. Jenkins.

### SPECIAL RESERVE OF OFFICERS.

Lieutenants to be Captains: B. J. Daunt, W. Saunderson, H. J. Wright, D. Columbos, W. E. Dickinson, H. T. Lamb, C. C. Harrison, F. B. Jago.

To be Lieutenants: F. C. A. Frith, F. Portas, J. R. Harris, C. W. Armstrong, and W. G. Verlaque (from University of London Contingent O.T.C.), M. W. H. Miles, M. Morrison.

### TERRITORIAL FORCE.

Major G. G. Turner is restored to the establishment.

Capt. (temp. Major) T. B. Wulstenholme to be acting Lieutenant-Colonel whilst commanding a Casualty Clearing Station.

Capt. L. C. Bruce is seconded whilst holding a temporary commission in the Royal Army Medical Corps.

### APPOINTMENTS IN THE INDIAN MEDICAL SERVICE.

It was recently announced that after the last open competitive examination for admission to the Indian Medical Service no similar examination would be held during the continuance of the war, but that such appointments as might be required to meet the absolutely indispensable needs of the Service would be made by nomination by the Secretary of State. To assist him in making these appointments, which, as already announced, will be limited in number to the absolutely indispensable needs of the Service. Mr. Chamberlain has appointed a Selection Committee who will summon and interview such applicants as may appear to be *prima facie* suitable and make recommendations for appointment. Applications for appointment should be addressed to the Secretary of the Military Department India Office, Whitehall, S.W., and should contain concise particulars of the applicant's medical degrees and career. Applicants must be over 21 and under 32 years of age at the time of application. Particulars regarding pay, promotion, &c., in the Service can be obtained from the Secretary, Military Department.

## URBAN VITAL STATISTICS.

(Week ended March 3rd, 1917.)

*English and Welsh Towns.*—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18,000,000 persons, the annual rate of mortality was equal to 18·4, against 22·5 and 21·0 per 1000 in the two preceding weeks. In London, with a population exceeding 4,000,000 persons, the death-rate was 18·0, or 3·8 per 1000 less than that recorded in the previous week; in the remaining towns the rates ranged from 5·8 in Cambridge, 6·8 in Enfield, and 9·1 in Coventry, to 28·4 in Wigan, 29·6 in Bath, and 30·6 in Tynemouth. The principal epidemic diseases caused 350 deaths, which corresponded to an annual rate of 1·0 per 1000, and included 174 from measles, 51 from infantile diarrhoea, 47 from diphtheria, 43 from whooping-cough, 9 from scarlet fever, and 4 from enteric fever. The deaths from measles showed a further increase on the numbers in the five preceding weeks, and caused the highest annual rates of 4·2 in Wigan, 5·5 in Wimbledon, 5·8 in Ford, and 6·5 in Warrington. The 829 cases of scarlet fever and the 1436 cases of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 16 and 18 in excess of the numbers at the end of the previous week. Of the 6120 deaths from all causes in the 96 towns, 243 resulted from violence. The causes of 57 of the total deaths were uncertified, of which 12 were registered in Birmingham, 8 in Liverpool, and 6 in London.

*Scotch Towns.*—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death rate was equal to 17·9, against 20·1 and 19·6 per 1000 in the two preceding weeks. The 362 deaths in Glasgow corresponded to an annual rate of 16·9, against 18·0 per 1000 in London, and included 13 from whooping-cough, 2 each from measles, diphtheria, and infantile diarrhoea, and 1 from scarlet fever. The 136 deaths in Edinburgh were equal to a rate of 2·4 per 1000, and included 5 each from measles and whooping-cough, and 1 each from enteric fever and diphtheria.

*Irish Towns.*—The 195 deaths registered in Dublin were equal to an annual rate of 25·5, or 1·3 per 1000 below that recorded in the previous week, and included 7 from measles, 3 from infantile diarrhoea, and 1 from enteric fever. The 169 deaths in Belfast corresponded to an annual rate of 22·4 per 1000, and included 3 each from measles and infantile diarrhoea, 2 each from whooping-cough and diphtheria, and 1 from enteric fever.

THE King has appointed Mr. Alfred Murray Gray and Lieutenant-Colonel G. B. Stanistreet, R.A.M.C., Esquires of the Order of the Hospital of St. John of Jerusalem in England.

## Correspondence.

"Audi alteram partem."

### TUBERCULOSIS AND THE WAR.

To the Editor of THE LANCET.

SIR.—Referring to the portion of your leading article of Feb. 17th dealing with the tuberculous soldier, it appears that possibly the best solution is *in medio tutissimum ibis*. The suggestions of both Dr. T. D. Acland and Dr. E. H. R. Harries can be reconciled by keeping the tuberculous soldier still undischarged from the Army, and allowing him a few days' furlough with his family, before ordering him into a sanatorium. Men are very human, and it hardly savours humanity to condemn a man to three months' residence in a sanatorium, in his own district, after, say, a year in France, without allowing him a reasonable chance of seeing his relatives. The time thus occupied could be made use of by requiring his attendance at the dispensary, so that his class and treatment could be carefully considered, on behalf of the Insurance Committee. Quite a considerable number will be found not to require sanatorium treatment (Class 1), but would do better with light work, if permitted. In many instances light work of military character would be very beneficial to prevent the development of the loafing habit, which is so dangerous to the mentality of the early tuberculous case. Suitable cases (Class 2) would then be ordered into the sanatorium, with the requisite authority. Discipline, which is now our main difficulty, could thus be maintained. Then the tuberculosis officer could also be consulted on the question of pensions and allowances.

There are still left the hopeless cases of men who should have been under treatment long anterior, and who, ordinary humanity and British sense of justice demand, should be given decent conditions to terminate their lives, sacrificed in the interests of their country. The advanced cases are a distinct problem in finance. If they still remain in the Army the Insurance Committee would be reimbursed for their expenses, but not in a lump sum, as at present, for their passage may be protracted. The present procedure makes a contest between the economic and patriotic feelings of the Committee.

If these views are correct, all cases should be undischarged until their classification and treatment have been reported on by the tuberculosis officer, who is to have charge of the case, and pensions and allowances could then be apportioned by the Board, after being provided with his views, in accordance with the actual requirements of the case, the country's interest, and honour.

I am, Sir, yours faithfully,

H. A. ELLIS,

Tuberculosis Medical Officer, County Borough of Middlesbrough.  
March 2nd, 1917.

### A PLEA FOR THE EARLIER POST-OPERATIVE RAYING OF BREAST CANCER.

To the Editor of THE LANCET.

SIR.—It is unnecessary for me to advocate the raying of all cases of carcinoma, at least of the breast. Most surgeons send their hospital patients to the X-ray department so soon as the patient has regained strength sufficient to allow of her being moved. The system for which I now wish to put in a plea is merely the logical extension of this. "If it were done, when 'tis done, then 'twere well it were done quickly," and, I may add, the surgeon should make a point of seeing that it is done in all cases, and not leave this important, perhaps vital, matter to the discretion of an adviser who may, perhaps, have no knowledge on the subject.

The best time to administer the X-ray is undoubtedly at the operation. Then we can give two or more full skin doses without having to take the skin into consideration, but when I have proposed this course to surgeons I am met with the objection that it adds to the length of an operation already too lengthy. Whether this objection is a valid one I cannot say. Patients did very well after the operation

20 years ago, when I should say the average time taken was double what it now is, and in any case it is perhaps more the loss of blood than the length of operation which is detrimental.

I have recently had occasion to witness one or two operations for breast cancer, and as far as I am capable of judging, the present technique is perfect. Not much more progress can be made in shortening the operation, but as bleeding causes most of the delay, any improvement must take place in the method of checking this. I was much struck some years ago at the rapidity with which bleeding was checked by the use of the De Keating Hart air-cooled high-frequency current, called by him fulguration. I saw this employed in desperate cases of malignant disease, not for the purpose primarily of checking bleeding but for its reputed effect in preventing recurrence. I had also the opportunity of inspecting some of the patients who had been operated on at various periods, and I was struck by the suppleness of the scars and by the small amount of distortion caused, in spite of the large amount of tissue destroyed by the disease and removed at the operation. I was told by the surgeon that the fulguration did not delay but actually seemed to help healing. I did not see it used on closed wounds, however, and it might turn out detrimental to them. Here, it seems to me, is the direction in which to look for a means to shorten the operation for breast cancer, and the time saved by these means could be utilised to give the parts a thorough raying before the wound is closed. With the Coolidge tube two or three doses could be given in 15 minutes. This preliminary raying could then be followed up by a series begun as soon as the stitches are out.

It is true that excellent results are obtained in many cases of breast cancer now by operation alone, but the radiographer sees also many failures. If we and the surgeons could join our forces together more efficiently we might see still better results, and in any case there is no excuse for not trying.—I am, Sir, yours faithfully,

J. J. GRACE, F.R.C.S. Eng.,

Chief Assistant, X Ray Department, St. Bartholomew's Hospital, Welbeck-street, W., March 5th, 1917.

### SPIROCHÆTAL JAUNDICE.

To the Editor of THE LANCET.

SIR.—I have seen several letters regarding the nomenclature suggested to be given to the "spirochætosis icterohæmorrhagica" which has appeared at the various fronts of the belligerents in Europe. It appears to me that neither "spiroc. icterohæmorrhagica" nor "spirochætal jaundice" is quite appropriate. I would respectfully suggest that it be called "spirochætosis ictero-albuminurica," (1) because it has not yet been satisfactorily proved that the disease observed in Japan is the same as has been noticed in Europe. (2) or because "haemorrhage" is very rarely found in European cases, whilst "albuminuria" is, in fact, always present.

It appears to me also, not appropriate the name "spirochætal jaundice," because in Egypt, Indo-China, and the Arabian coasts of the Red Sea is endemic a relapsing fever with jaundice. The nomenclature I suggest, "spiroch. ictero-albuminurica," indicates the etiology, the two principal and constant symptoms, and the seat of the disease (*causa sedesque morbi*). I am, Sir, yours faithfully,

Rome, Feb. 28th, 1917.

Prof. UMBERTO GABBI.

### ECONOMY IN FEEDING.

To the Editor of THE LANCET.

SIR.—The medical profession is in a position to serve the imperial cause in a modest way by offering advice to patients in the matter of foodstuffs. A rigorous diet is twice blessed—it is patriotic and it encourages health, especially among the idle rich. Among persons of moderate estate it constitutes no mean agency in the encouragement of household economy. Among households visited by me in my daily work I find many persons eager to adopt suggestions which I have made in this matter. I recommend two meatless days in the week and a meatless luncheon every day. A luncheon dietary which I am told is strictly followed in many houses consists of oatmeal porridge, followed by salads or fruit. Many patients have told me that even after war is over they intend to follow the dietary suggested, since never before

meatless days and meatless luncheons were instituted in their household economy had they experienced better health, and never before had housekeeping money gone as far. Moreover, even without any persuasion, servants follow the example of economical living set by the heads of households.

I am, Sir, yours faithfully,

Streatham Hill, S.W., March 2nd, 1917. H. WALTER VERDON.

\* \* Servants cannot follow examples, however good, without detailed instructions, and these in too many instances cannot be forthcoming. Moreover, emergency instructions are not much good; the training ought to have preceded the existing situation.—ED. L.

## OFFICIAL MEDICINE AND THE THRIFTY SPIRIT.

To the Editor of THE LANCET.

SIR,—“I thank Thee that I am not as other men are.” These words sprang to my mind as I read the letter of your correspondent under the above title in your issue of Feb. 24th, and my heart burned within me to reply, but I felt sure that abler pens than mine would deal with the writer and forbore. Doubtless those who could answer have more precious work to do, or in the good old English way (*the mens concia recti*) feel that it would be undignified, but as many who read the unworthy libel may believe that silence implies a knowledge of guilt, I will venture to say a word.

There are three charges:

1. That the diners were guilty of unpatriotic waste. The answer is that the dinner was a simple, strictly “Devonport” meal, and that no one *could* have eaten more than he would have done at home. Is it more wasteful for 60 men to dine together than at 60 different tables? When communal meals are urged as a war economy it is rather silly to blame men for saving the expense of 60 separate dinners by agreeing to dine together. Those who shared it must have smiled bitterly at the charge of “feasting” and “overstepping the Controller’s food allowance.” I know I enjoyed my bread-and-cheese supper when I finished my day’s work at midnight!

2. That the honour to Sir Alfred Keogh should be postponed till after the war. The King thinks otherwise, and that it is well to cheer and encourage his soldiers and sailors during the war, and if ever a man deserved the encouragement of the approval of the profession he honours—*now*—it is the Director-General, whose work has been hindered and injured by the ignorant criticism of jealous enemies in high places and—with shame be it said—by the attacks of members of the medical profession.

3. That the Royal Society of Medicine is not doing its “bit” for the war. This last only accuses the accuser, for it proves that he has grossly neglected his duty as a Fellow, and knows nothing of the war activities of his *confrères*. Immediately on the declaration of war those responsible for the work of the society set themselves to consider what it could do to help, and it would scarcely be an exaggeration to say that almost the whole work of the society since then has been directly or indirectly war work.

You, Sir, could not allow the space were I to attempt to catalogue its war activities, but I know that not once but many times has it received the warm thanks of the War Office for its help, and that scarcely a day passes that letters and messages are not received from Whitehall. Does the writer of the attack know that the War Office at its own expense keeps a special telephone attendant at 1, Wimpole-street, and has installed a private telephone wire exclusively for war work? He is ignorant, too, of the abstracts, translations, reports, and even books and instruments which are being sent to medical officers at the various fronts, and have brought to the society heaves of grateful letters. I know something of these things, because I consider it my duty to know what any society with which I am connected is doing for the war, and if possible to help it. If your correspondent knows of anything useful the society could do, and is not doing, I am authorised to say his suggestions will be cordially received.

I am, Sir, in proud humility,

March 7th, 1917.

A PUBLICAN AND SINNER.

## Obituary.

### THE LATE PROFESSOR DÉJERINE.

FRENCH science has suffered a severe loss in the death of Professor Déjerine on Feb. 26th. Born at Geneva on August 3rd, 1849, of French parents, he studied medicine at the Paris hospitals, graduating in 1879 with a thesis on the nervous lesions of ascending paralysis. From this time on he devoted himself to the study of nervous diseases and their pathological anatomy. Chief of the clinic in 1879, he was elected to the hospital staff in 1882, becoming professor in 1901. Occupying in succession the chairs of history of medicine and clinical medicine, he found his proper place in the Salpêtrière clinic, where, after Raymond, he succeeded Charcot. His work marked distinct progress in the knowledge of nerves and of the central nervous system. He had as frequent collaborator Mme. Déjerine, née Klumpke, the first woman to hold the title of interne at the hospitals, and especially in the remarkable work, “Anatomie du Système Nerveux.” Of other important works, the “Traité des Maladies de la Moelle Épinière” was written in collaboration with Dr. Thomas, and a chapter, “Sémiologie du Système Nerveux” appeared in Bouchard’s “Text-book of Systematic Pathology.” Dr. Déjerine devised a method of examining the spinal cord in thin serial sections, which notably advanced the study of the pathological lesions of nervous tracts. His influence may be seen in the history of our knowledge of most nervous diseases—e.g., tabes, myelitis, radiculitis, aphasia. His great gifts were recognised during his life-time: in 1908 he was elected member of the Academy of Medicine, and he was an officer of the Légion d’Honneur.



LOUISA WOODCOCK, M.D., B.S. LOND., M.A. T.C.D., PHYSICIAN TO ENDELL-STREET MILITARY HOSPITAL, LONDON; PHYSICIAN TO OUT-PATIENTS, NEW HOSPITAL FOR WOMEN.

Dr. Louisa Woodcock, whose death on Feb. 17th in her fifty-second year we briefly recorded a fortnight ago, was educated at Cheltenham, where she studied classics, especially being attracted by the Greek language and literature. Passing on to Somerville College, Oxford, she took Honours Schools in morphology and zoology, spending a further year in the study of philosophy. In recognition of this work the University of Dublin awarded her the degree of M.A. From Oxford she entered the London (Royal Free Hospital) School of Medicine for Women, obtaining in 1900, after a six-years’ course, the degree of M.B. Lond. with honours in medicine and the M.D. in medicine four years later. At this hospital she held the Mabel Webb Research Scholarship in Pathology. After qualification Miss Woodcock took the first resident appointment opened to women at the Royal Free Hospital, that of house physician, and was then in succession pathologist and demonstrator of clinical pathology. At the New Hospital for Women, Euston-road, after holding resident posts, she became pathologist, and in 1907 physician to out-patients, and held the senior post at the time of her death.

In addition to these appointments Dr. Woodcock had a varied clinical experience which broadened her outlook and gave her a conscious security in her many fields of work. She was part-time assistant medical officer to the London County Council, doing special work on children’s eye-sight; she was medical officer to the Epileptic Colony at Chalfont

St. Peter, medical inspector to Bedford College, to the London Collegiate School for Girls and the Camden School for Girls, as well as medical officer under the Elementary School Teachers Act. She was also at one time Research Scholar at the London School of Economics.

When the war came yet other duties were added to a life already full to overflowing. Dr. Woodcock became treasurer to the Women's Hospital Corps from its inception in August, 1914, and did much organising work for the corps while it was at work both in Paris and at Wimereux. When the military hospital was opened at Endell-street she became physician, welcoming the opportunity of increased usefulness, but giving out energy more than she could afford, until the willing spirit could no longer dominate a constitution far from vigorous.

Dr. Woodcock's busy life and multitudinous duties gave her little time for writing, and apart from a report on melanoma of the eyelid (1903) and the recital of a case of glanders in THE LANCET (1906), her most important piece of work was to write, in association with Mrs. Sidney Webb, a report on the domiciliary treatment of the sick poor under the English Poor-law.

In social life Dr. Woodcock was regarded by many as very reserved, and so no doubt she was. One who knew her well ascribes this reserve in part to the result of temperament, in part to force of habit, and for the reason that, possessing so full a nature and a mind so well stored, she loved to be "at home" within, considering, ordering, planning—here, indeed, was her workshop. "But," he adds, "though reserved, Dr. Woodcock was capable of the closest and deepest friendship, and in its cause of a devotion and self-sacrifice which knew no bounds."

"As a physician, Dr. Woodcock found her true vocation. She was of the type which Peter Mere Latham used to delineate in his clinical lectures to the students at St. Bartholomew's Hospital about the middle of the nineteenth century; her science was supplemented by her art, both were warmed by a large humanity. On such lines she went her quiet ways, herself the mistress of her life. Perhaps the justest measure of our success in life will be found in the extent to which, individually, we are minded in the sense of loss which we leave behind. Judged thus, Miss Woodcock's success has been, without doubt, a great achievement."

HORACE BENGE DOBELL, M.D. ST. AND., M.R.C.P.LOND., CONSULTING PHYSICIAN, ROYAL HOSPITAL FOR DISEASES OF THE CHEST, LONDON.

THE death of Dr. Horace Dobell, on Feb. 22nd, at Parkstone Heights, Dorset, in his ninetieth year, removes a figure well known in London medical circles in the "seventies."

Horace Benge Dobell was the son of John Dobell, of Cheltenham, and after apprenticeship to a local surgeon entered St. Bartholomew's Hospital in 1845. Qualifying M.R.C.S. he commenced practice with a success which justified his removal to Harley-street in 1864. His attention was chiefly directed to diseases of the chest and pulmonary tuberculosis, and he was elected in 1858 to the staff of the Royal Hospital for Diseases of the Chest in City-road, becoming consulting physician in 1874. Leaving London in 1882 on account of his wife's health he settled at Bournemouth, where he practised as a consulting physician, R. L. Stevenson being among his patients at this time. In 1892 he retired from practice and built himself a house at Parkstone, over-looking Poole Harbour, where he lived until his death.

Dobell was a member of the old school before specialism developed, and while he aspired to be master of one part of his art he kept up his general knowledge. Extremely observant, his accuracy in diagnosis and skill in treatment were exceptional. Patient, sympathetic, and rapid, though never in a hurry, his patients became closely attached to him, and on his last birthday he received many letters of congratulation from those whom he had previously attended and from the children and even grand-children of old patients. He had seen the birth of modern medicine—when he went to St. Bartholomew's Hospital Paget possessed the only microscope there—and it was his hobby to follow its growth. From 1869 to 1877 he published a series of reports on the progress of medicine in different parts of the world. Earlier in his career the Royal Society had published his researches on the "Action of Light

on Animal Organisms," but the work was not continued. Long after retiring from practice he gave a sum of money to the Royal College of Physicians of London to endow lectures for research in bacteriology. His medical works include "Bacillary Consumption: its Nature and Treatment" (1889), "Diet and Regimen in Sickness and Health," of which the seventh edition appeared in 1882, and several others on various aspects of diseases of the chest. At the time of his death he was senior Member of the Royal College of Physicians of London and consulting physician to the Royal Albert Orphanage, Bagshot.

Dr. Dobell came of an artistic family. He was a fine artist himself, always illustrating his own books, and skilful in everything requiring manipulation, including music. In 1849 he married Elizabeth Mary Fordham, of Odsey House, Herts, who died in 1908. There were three daughters of the marriage, two of whom are living.

#### PETER HUGH MONTGOMERIE MACKELLAR, M.A., M.B., O.M. GLASG.

We announce with much regret the death on Feb. 20th, at the age of 72, of Dr. P. H. Montgomerie Mackellar, who was for many years a member of THE LANCET staff.

Dr. Mackellar was the son of Edward Hugh MacKellar and of Johanna Parkins MacKellar, daughter of Duncan Montgomerie of Buchanan. He received his education at the Loretto School, Musselburgh, Scotland, and entered Glasgow University, where he was a gold medallist, qualifying M.B. in 1866 and taking his M.A. degree in the same year and the C.M. five years later. After obtaining his medical qualification he entered the service of a shipping company as surgeon and made several voyages to South America, collecting specimens of the flora and fauna of the countries he visited and presenting them to his old teachers on his return home. Before leaving Scotland he held an appointment at the City of Glasgow Fever Hospital, afterwards becoming medical officer to the Joint Counties Asylum at Abergavenny. Coming to London, he was appointed assistant medical officer to the District Small-pox Hospital at Stockwell, and later medical officer at the Fever Hospital of the Asylums Board there. In 1873, on the occasion of an epidemic of relapsing fever, Dr. Mackellar made his first contribution to our columns in a careful description of the cases admitted to the hospital.

Dr. Mackellar was a man of marked originality of mind, which expressed itself in a singular absence of convention combined with an extreme tenacity of purpose. His schooling did not begin until he was 10 years of age, although taught to read at home, and he attributed his success at school and college to this mental freedom of his early years. At college he came specially under Kelvin's influence in natural philosophy, Lister's in medicine, and their influences were ruling factors in his life. While never neglecting an opportunity of adding to his medical knowledge, he found time for many recreative studies, which contributed to make him a broad scholar. He possessed a sound knowledge both of chemistry and mathematics, while engineering, wood turning, and wood engraving also occupied some of his attention. He was a proficient Latinist, could read French, German, and Italian fluently, and could speak the first tongue idiomatically.

His body was interred at Fulham New Cemetery on Feb. 27th.

#### THE LATE MR. ROBERT BRUCE.

Robert Bruce, M.R.C.S. Eng., L.S.A., D.P.H. Camb., who died in London on Feb. 3rd at the age of 63, was educated at the City of London School and St. Bartholomew's Hospital, qualifying in 1875 as L.S.A., and becoming in the following year a Member of the Royal College of Surgeons of England. He later obtained the Public Health diploma of Cambridge. After holding a resident appointment at the Borough Hospital, Birkenhead, he came to London, where he succeeded his father in practice at Old-street, St. Luke's, moving later to Finsbury. At this time he was a district surgeon to the City of London Lying-in Hospital. In 1890, on account of his wife's health, he went to Milford, where for 26 years he was untiring in the work of his profession and in promoting in other ways the well-being of his adopted home. The Milford Cottage Hospital owes its origin to his initiative. Outside his private practice Mr. Bruce was district medical officer and public vaccinator for the Lymington Union, Admiralty surgeon and agent, and surgeon in charge of the troops at Hurst Castle. He was a justice of the peace for the county of Southampton.

## The War.

### THE CASUALTY LIST.

The following names of medical officers appear among the casualties announced since our last issue:—

#### Killed.

Walker, Surg.-Prob. G. P., R.N.V.R.

#### Died.

Capt. G. S. Husband, D.S.O., I.M.S., received his medical education at Edinburgh and qualified in 1904. He entered the Service in 1907, and his D.S.O. was awarded early in June last year.

#### Slightly Wounded.

Surg. F. G. E. Hill, R.N.

### OBITUARY OF THE WAR.

#### JAMES FROUDE FLASHMAN, M.D. SYDNEY.

LIEUTENANT-COLONEL, AUSTRALIAN ARMY MEDICAL CORPS.

Lieutenant-Colonel J. F. Flashman, who recently died of pneumonia in France after a few days' illness, was a graduate of the University of Sydney, qualifying M.B. in 1894 and M.D. in 1897, and remaining there in practice at 183, Macquarie-street. He



came over with the Australian troops, and from November, 1915, until January, 1917, was attached to the 3rd London General Hospital at Wandsworth, where large numbers of the troops are treated. In January he wished to be nearer the front line, but soon succumbed to the inclement weather prevailing there.

Lieutenant-Colonel H. E. Bruce-Porter, to whose account of Colonel Flashman in the *Gazette of the 3rd London General*

*Hospital* we are indebted for the personal details, speaks of him as a man who threw himself heart and soul into the life and work of the hospital. "During the time he was here he endeared himself to everyone, both staff and patients, with whom he came in contact, and his cheery smile was good to see." We join with Colonel Bruce-Porter in heartfelt sympathy to Colonel Flashman's widow and children.

### DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

Able Seaman B. G. Richardson, Royal Naval Division, youngest son of Dr. C. Richardson, of Leeds.

Capt. N. West, M.C., Royal Berkshire Regiment, second son of Capt. C. J. West, R.A.M.C., of Newbury, Berks.

### THE HONOURS LIST.

The following awards to medical officers are announced:—

#### Distinguished Service Order.

Temp. Capt. Charles Owen Donovan, R.A.M.C., attached North Lancashire Regiment.

For conspicuous gallantry and devotion to duty. He displayed courage of a very high order over a period of 48 hours in attending to a large number of wounded of his own and other units in a shallow muddy trench, which was continually subjected to heavy fire. On another occasion he dressed several wounded officers in the open. He was severely wounded.

#### Military Cross.

Temp. Capt. George Noel Braham, R.A.M.C.

For conspicuous gallantry and devotion to duty. He with four others worked continuously under intense fire, and succeeded in rescuing several wounded men from the advanced dressing station, which was untenable. He set a fine example of courage and determination throughout.

#### Temp. Capt. John Crawford, R.A.M.C.

For conspicuous gallantry and devotion to duty. He took a party of stretcher-bearers to the position and proceeded to attend to the wounded under heavy fire. He set a fine example of courage and coolness throughout.

#### Temp. Capt. John Ferguson, R.A.M.C.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in tending to the wounded under the most intense hostile fire. Later, although himself wounded, he remained at his post until all the wounded men had been dressed.

#### Capt. Alaister Fraser Lee, R.A.M.C.

For conspicuous gallantry and devotion to duty in attending to a very large number of wounded under continuous heavy shell fire. He was thrown down and wounded by the explosion of a shell, but continued to perform his duties in the most gallant manner.

#### Temp. Capt. William Douglas Reid, R.A.M.C., attached Manchester Regiment.

For conspicuous gallantry and devotion to duty. He displayed great courage and skill in tending the wounded under heavy fire. Later, although himself wounded, he continued to dress the wounded of all units. He has previously done fine work.

#### Capt. David Christopher Vey, R.A.M.C., Spec. Res., attached East Lancashire Regiment.

For conspicuous gallantry and devotion to duty. He attended to the wounded in an open trench under very heavy fire. Later, he assisted to bring in many wounded men from the advanced trenches. He set a splendid example of courage and determination throughout.

#### Capt. Cyril James Berkeley Way, R.A.M.C., Spec. Res.

For conspicuous gallantry and devotion to duty. He repeatedly led his bearers through intense enemy barrages. He personally rescued several wounded men from shell-holes under machine-gun fire.

#### Capt. Charles Kingsley Parkinson, Aust. A.M.C.

For conspicuous gallantry and devotion to duty. He brought several wounded stretcher-bearers into the dressing-station under very heavy fire, thereby undoubtedly saving many lives. He set a splendid example of courage and determination throughout.

#### Foreign Decorations.

The following decorations conferred upon British medical officers are announced:—

#### By the King of Italy.

Officer of the Order of the Crown of Italy.—Fleet-Surg. R. Hughes, R.N.; Staff-Surg. T. W. Myles, R.N.

#### By the President of the French Republic.

Croix de Guerre with Palm.—Capt. A. G. Whitehorne-Cole, R.A.M.C.

### MENTIONED IN DESPATCHES.

The following names are to be added to those mentioned in the despatch received from Field-Marshal Sir Douglas Haig, G.C.B., reported in THE LANCET of Jan. 13th, p. 82:—

Col. R. E. Roth, D.S.O., V.D., Australian A.M.C.; Maj. H. L. St. V. Welch, Australian A.M.C.

### THE CENTRAL MEDICAL WAR COMMITTEE.

During the week the Executive Subcommittee have been considering the financial aspects of the mobilisation scheme for doctors, as well as the matters to be discussed at the forthcoming Conference arranged at the instance of the Director-General of National Service under the chairmanship of Sir Donald MacAlister. The Central Medical War Committee will be represented at the Conference by Mr. T. Jenner Verrall, the chairman of the Committee; Mr. Bishop Harman and Dr. Alfred Cox, the honorary secretaries of the Committee; Dr. C. Buttar, the chairman of the Executive Subcommittee; Mr. E. B. Turner; and Dr. B. A. Richmond, secretary of the London Panel Committee. The Committee of Reference of the English Royal Colleges will be represented by Dr. Frederick Taylor, and Sir Rickman Godlee, with Mr. F. G. Hallett, the honorary secretary of that Committee. Mr. Neville Chamberlain has accorded an interview already to Dr. Taylor, Mr. Verrall, Dr. Buttar, and Mr. Bishop Harman, at which the work of the Central Medical War Committee was fully explained, and there is no doubt that this clearing of the ground will be of use in the forthcoming Conference. The Scottish Medical Service Emergency Committee will be represented at the Conference by Dr. John Adams, vice-chairman of the Scottish Committee of the British Medical Association; Dr. John C. McVail, deputy chairman of the National Health Insurance Commission of Scotland; and Dr. Norman Walker, the convener of the Emergency Committee. Sir Donald MacAlister should therefore be presiding over a very business-like as well as representative group.

### THE WAR CRIPPLE: THE MINISTRY OF PENSIONS SCHEME.

The important statement made by Mr. Barnes, Minister of Pensions, last Tuesday in the House of Commons clears up the intentions of the Government towards the soldier crippled in the war.<sup>1</sup> Mr. Barnes described with candour the care and welfare of disabled men as the most backward part of the work of the Ministry, and announced that he had at last arrived at an agreement with the War Office on the crucial question: When should the wounded or invalidated man be discharged from the military hospital? His own original view that the man should be retained by the War Office until he was wholly cured or pronounced to be incurable had been modified by his experience of the effect of hospital life and discipline on the man's nervous temperament, and the agreement was now as follows:—

The War Office undertook to keep the wounded or invalidated man in the appropriate military hospital as an in-patient, so long as there was accommodation for him, and would include in the treatment appropriate manual curative treatment. After the man had been invalidated out, or declared to be no longer fit for service, the War Office would keep him in hospital another three weeks. During that time facilities would be given to the representative of the local Statutory Committee to see the man and the hospital authorities. Generally speaking, those three weeks were intended as a jumping-off place within which arrangements might be made for the man's subsequent treatment. As soon as the man was invalidated a card would be made out indicating the sort of treatment he needed. A duplicate of the card would be made, and one copy given to the man and one sent to the district in which he intended to reside. By these means the man would be saved from floating about the country without being in contact with any authority or body. The War Office also undertook to treat the man in his own district as an out-patient.

Mr. Barnes passed in review with warm commendation the various voluntary agencies which had up to now befriended the disabled sailor and soldier: instancing St. Dunstan's Hostel, the Star and Garter Home, the Queen Mary Convalescent Hospitals at Roehampton, the Hospitals for Orthopaedic Cases, the Scottish Red Cross, which dealt with the limbless men on the Clyde, the English Red Cross, and the Soldiers' and Sailors' Aid Society; and finally the War Pensions, &c., Statutory Committee. He then stated that he had sanctioned the setting up of a further Committee responsible to the Ministry of Pensions to deal in the first place with disabled soldiers requiring institutional treatment. This Committee was presided over by Colonel Sir A. Griffiths-Boecawen, Parliamentary Secretary to the Ministry of Pensions, and included Sir Walter Lawrence, representing the War Office, Mr. Cyril Jackson, vice-chairman of the Statutory Committee, and the Hon. Arthur Stanley, representing the British Red Cross. What is intended to be the relation of this new committee to the Statutory Committee itself Mr. Barnes did not state, but presumably the mechanism of the local Statutory Committees up and down the country will be utilised.

The Ministry intended, Mr. Barnes said, to provide new institutions for the disabled men and to make use of the material help, as well as the experience, of the Red Cross Society. One such institution had already been started for neurasthenics at Golders Green, London, N.W., and one for epileptics at Chalfont St. Giles, Bucks.

The difficulty in deciding on the allocation of the cost of dealing with the discharged war cripple between the State and the Approved Societies under the National Insurance Act had been met, he said, by an agreement that additional sickness should be a charge upon the State. Presumably this charge will also cover the added work thrown upon the panel practitioner, whatever this turns out to be in practice. The number of disabled men at present drawing pensions Mr. Barnes gave as 140,275, with an additional 65,000 or so medically unfit and 65,000 men in hospitals who had not yet reached the pension stage.

In the absence of military discipline after discharge from the Service, what pressure it was proposed to bring upon the disabled man to induce him to undergo proper treatment and training Mr. Barnes stated thus: The man who refuses treatment is to be fined half his pension; and the man who agrees to train for a new occupation is to be given

full pension, full separation allowance for his wife, and have his special training fees paid for him.

Mr. Barnes dealt also with the question of the medically unfit, of whom he was told that 100,000 had been passed into the Army, describing them as "veritable weeds, who never should have been there at all." Some of them, he said, had concealed their ailments, and thousands had not done more than two or three days' service. As the State must assume some responsibility for them, he proposed to put these men back where the State had found them with a small gratuity on a scale which had been drawn up. In exceptional cases the gratuity would amount to £100.

### *Sir Henry Norman's Report on the Treatment and Training of Disabled and Discharged Soldiers in France.*

The publication of the full text of Sir Henry Norman's report<sup>2</sup> has been delayed until the Ministry of Pensions Scheme was ready. Sir Henry Norman received a request on Sept. 21st last from Mr. Lloyd George, then Secretary of State for War, to report upon the French system and method of dealing with the problem of the medical treatment and training of disabled and discharged soldiers in France, both from the medical and administrative standpoints. The report as now printed begins with an account of the history and development of French administrative control, going on to describe in detail the principles of re-education of the war cripple and the means at disposal for carrying it out, and ending with suggestions regarding the treatment of disabled soldiers in the United Kingdom.

Sir Henry Norman describes the results of the French system of treating disablement as marvellous, and stated in the House of Commons on Tuesday that total disablement had almost ceased to exist in France. But he also fully realises the difficulty of voluntary re-education, saying:—

The difficulty is this. The Service of Health, which is part of the Ministry of War, deals, of course, only with soldiers. A man needing an artificial limb is sent to a centre of surgical equipment, which is always attached to a military hospital, and while receiving hospital treatment he may follow a course of re-education to fit him to return to his old trade or to take up a new one. This, however, is entirely voluntary; the best men gladly avail themselves of the opportunity, but a large number do not. These men, who often spend months in hospital, have the greater part of the day free; they are given leave, and spend their time sitting about the grounds or walking the streets, with results frequently disastrous to themselves. .... The inability of the State to control a man after he is discharged from the Army constitutes a very difficult problem, which will have to be faced in both countries.

Mr. Barnes's scheme faces these difficulties, and, it is to be hoped, may afford a solution of them; but Sir Henry Norman regards the half measures proposed as unsatisfactory. He calls attention also to the long waiting list at Roehampton and the Military Orthopaedic Hospital, Hammersmith. Further instruction may be derived from his characterisation of the strong and weak points of the French system:—

The strong points of the French system are the deep and universal sympathy felt for the disabled soldier; the national determination to do everything possible for him who has done so much for France; the keenness of all Ministers and officials to spare no effort and overlook no channel of usefulness; the readiness of Parliament to provide ample funds; the high scientific and specialist knowledge that is being devoted to the subject; and the desire that every part of France shall be prepared to offer to the disabled man the opportunity to return physically and intellectually re-equipped to civil life. All these things evoke one's profound admiration.

The weak points appear to be the absence of effective and authoritative coöordination; the dispersion of precious effort along parallel and even conflicting lines; the rivalry of different Ministries, none of which is willing to be dispossessed of functions it has exercised for a long time and which it regards as of paramount national importance; the retention by the military authorities of some activities which appear essentially those of civil administration; the undecided conflicts of technical opinion; and the increased expenditure resulting from the foregoing situation.

\* H.M. Stationery Office. Price 4d.

HAWARDEN CASTLE HOSPITAL.—Mr. Henry Gladstone has lent Hawarden Castle to the War Office for use as a hospital for wounded officers. Accommodation will be provided for 250 patients.

<sup>1</sup> See THE LANCET, March 3rd, p. 344.

**WOUNDED ALLIES RELIEF COMMITTEE.**—Twenty-two large cases of drugs and other hospital requisites have been sent out for the relief of the Roumanian Army by the committee. The contents of ten of these cases came from the Wounded Allies Relief Branch of the Kensington War Hospital Supply Depôt, 176, Cromwell-road, S.W., and included, among other things, 10,590 assorted swabs, 6369 bandages of various kinds, and considerably over 200 splints.

**THE WORK OF THE RED CROSS.**—The annual report and statement of accounts of the British Red Cross Society and the Order of St. John for the year ending October, 1916, is a record of a vast field of beneficent labour. Specially noteworthy is the lowness of the administration expenditure. Including the work at home and in all the theatres of war, excluding hospitals, this amounted to £85,298, or 6 67d. for every sovereign received. The income for the year was £3,064,232, an increase of more than £1,000,000 on the previous year. The total expenditure in 1916 was £1,815,353; of which the following details are of interest:—

Transport of wounded naturally accounts for the largest single item of expenditure. On the purchase and equipment of ambulances, soup kitchens, cars, wagons, and cycles—of which the societies now have 2522 in all, mostly working abroad—£205,593 were spent. Working costs—upkeep and maintenance—amounted to another £182,111. Transport of wounded cost £23,000 less than in 1915 for personnel, largely because, with the growth of their organisation, the Army authorities have taken over certain of the former Red Cross activities. In all, 1829 of the societies' ambulances are working in France and Flanders, others being spread over Egypt, Salonika, Mesopotamia, East Africa, Russia, Italy, and some 440 working at home.

Among their conclusions the committee state—

It is becoming increasingly necessary to determine the relative responsibilities of the Government and of organisations such as ours in this matter of the treatment and after-care of the men who have been disabled. The question is a very grave one, for such treatment must necessarily be continued for many years after the war. Its solution will depend in great measure on the pensions and allowances granted to disabled men, but to a still greater extent to the provision which the State may make for fitting these men, so far as possible, to take their part again in the civil work of the community.

The Report can be obtained, price 1s., from 83, Pall Mall, London, S.W.

The sale of gifts on behalf of the British Red Cross Society and the Order of St. John will be held on March 22nd and following days at Christie's Sale Rooms in King-street, St. James.

## Medical News.

**MEDICAL SICKNESS ANNUITY AND LIFE ASSURANCE FRIENDLY SOCIETY.**—The usual monthly committee meeting of this society was held on Feb. 16th, Dr. F. J. Allan being in the chair. The large number of claims arising from influenza during the previous month of necessity made the experience in excess of the expectation; but there is now a cessation of these claims, and appearances point to a possibility of a normal spring. For the first time for many years the half-pay experience of the society has been less than the expectation, and this is no doubt due to the more careful and rigorous medical examination that was enforced after the first year or two of the society's existence. After a period of inactivity of many years there has been introduced a new annuity table, which offers most facilities required for members desirous of obtaining deferred annuities. The society, therefore, now transacts the three forms of insurance for which it was originally founded, that is to say, sickness benefit during incapacity while a member is in active practice, annuity when this sickness benefit ceases, and life assurance to his representatives should he die. The annual report for 1916 was considered at this meeting and will be presented at the annual meeting of the members on March 27th. The society has laboured under more difficulties, it is thought, than any other insurance company; as dealing only with a specified profession, the majority of whose members are serving in H.M. Forces in various parts of the world, it is impossible to expect the normal increase

in new business which would have been experienced in ordinary times. In spite of this the report, as a whole, is satisfactory. Applicants for sickness insurance are no longer limited in the amount for which they can insure, provided such amount does not exceed three-fourths of the average professional earnings, and this regulation is being taken advantage of by many of the existing members in view of the high rates prevailing for locum tenens and cost of living generally. All further information may be obtained from the secretary, Medical Sick Society, 296, High Holborn, W.C.

Mr. W. Petersen has given £1000 to All-Saints' Hospital for Genito-Urinary Diseases, Vauxhall Bridge-road, for the endowment of a bed in memory of his son, who was killed in action.

**ASSOCIATION FOR PROMOTING THE TRAINING AND SUPPLY OF MIDWIVES.**—The twelfth annual meeting of this association will be held at 9, Queen Anne-street, London, W., on Thursday, March 22nd, at 3.30 P.M. The chair will be taken by Major A. P. Luff, R.A.M.C. (T.), and an address on Midwifery and Government Subsidies given by Dr. George Reid, county medical officer of Staffordshire.

**CHARITY ORGANISATION SOCIETY.**—The third of a series of lectures organised by this society on social subjects will be held at 34, Queen Anne's-gate, S.W., by invitation of Lady Glenconner, on Wednesday, March 21st, at 3.30 P.M. The lecturer, Dr. F. N. K. Menzies, principal assistant medical officer, London County Council, will deal with the prevention of consumption. Questions and discussion are invited after these lectures.

**MEDICAL MISSIONS IN CHINA.**—A joint conference of the National Medical Association of China and the China Medical Missionary Association was held from Jan. 24th to 30th at Canton, under the joint chairmanship of Dr. W. H. Venable and Dr. Wu Lien Teh, the respective presidents of the two associations. Valuable papers were read dealing with the medical work of the various missions, public health, and education. In the course of the proceedings the foundation-stone of the new Kung Yee Medical College was laid.

**THE MENTAL AFTER-CARE ASSOCIATION.**—At the annual meeting of this association, held on March 1st under the chairmanship of the Lord Mayor, Dr. Henry Rayner submitted the annual report, showing a substantial increase in the number of patients dealt with as well as a satisfactory financial situation. From this it appeared that gratitude often took the form of a repayment, in part of least, to the association when the patient's outlook became brighter. During the past year applications on behalf of 508 persons were received—viz., 371 women, 131 men—33 per cent. more than in 1915. 630 visits had been paid and 154 situations found. 203 patients spent varying periods in cottage homes. A successful branch is in operation in Birmingham. Sir William Collins, M.P., in proposing the adoption of the report, described the association as the guide, philosopher, and friend of those who, happily recovered from their acute mental condition, sought to take their place in the world again. Sir D. Brynmor Jones, who seconded the resolution, pointed out the useful place which the association filled, inasmuch as the discharge of a patient from an asylum did not necessarily imply immediate fitness to resume control of property or business without assistance.

**QUEEN CHARLOTTE'S LYING-IN HOSPITAL.**—At the recent annual meeting of governors it was reported that there had been a large increase in the number of patients admitted to the wards in 1916—namely, 2075 as compared with 1817 in 1915—and 2053 had been attended at home by the hospital midwives. Of the in-patients 407, and of the out-patients 911, were the wives of sailors and soldiers. In order to cope with the increasing work of the ante-natal department, a new and temporary out-patient department has been opened adjoining the hospital, and a physician, Miss Frances M. Huxley, M.D., has been appointed in charge. An infant consultation centre is also being opened, and a physician, Miss Margaret G. Thackrah, M.D., has been appointed in charge. The number of emergency cases admitted, the report stated, had been greater than ever. Last year there were 183, many of them being admitted in a grave condition and suffering from severe complications. The work has been carried on under difficult conditions owing to shortage of nurses, but the training school has maintained its reputation, only one candidate having failed to pass the Central Midwives Board examination out of 113 candidates. The Ladies' Association continues to give valuable assistance. A strong appeal is being made for liberal support to enable the committee to pay off the balance, nearly £2000, of the accumulated debt and to meet the cost of maintenance during the current year.

## Parliamentary Intelligence.

### NOTES ON CURRENT TOPICS.

#### Legislation on Venereal Disease.

**LORD RHONDDA**, the President of the Local Government Board, formally introduced in the House of Lords on March 6th a Bill to prohibit the treatment of venereal disease otherwise than by duly qualified medical practitioners, and to prevent the sale of quack remedies.

The text of the Bill is as follows:—

(1) In any area in which this Act is in operation, a person shall not, unless he is a duly qualified medical practitioner, for reward either direct or indirect, treat any person for venereal disease or prescribe any remedy therefor, or give any advice in connection with the treatment thereof, whether the advice is given to the person to be treated or to any other person.

(2) In any area in which this Act is in operation, a person shall not sell, offer for sale, supply, offer to supply, or dispense any drug or medicinal or other preparation as a remedy for venereal disease, unless the remedy is dispensed on, and in accordance with the written prescription of a duly qualified medical practitioner, and is supplied for the use of the person for whom the remedy has been prescribed: Provided that nothing in this section shall affect (a) the sale or supply of any such drug or preparation by, or to, a duly qualified medical practitioner; or (b) the wholesale sale or supply of any such drug or preparation.

(3) If any person acts in contravention of any of the provisions of this section, he shall be liable on conviction on indictment to imprisonment, with or without hard labour, for a term not exceeding two years, or on summary conviction to a fine not exceeding one hundred pounds, or to imprisonment with or without hard labour for a term not exceeding six months.

(4) In this Act the expression "venereal disease" means syphilis, gonorrhoea, or soft chancre, or any disease of the genito-urinary organs which may reasonably be suspected to be venereal disease.

The Act, if it becomes law, is to operate in any area to which it is applied by order of the Local Government Boards in the United Kingdom.

#### Criminal Law Amendment Bill.

A Grand Committee of the House of Commons began the detailed consideration of the Criminal Law Amendment Bill on March 6th. Having postponed the consideration of Clause 1 (punishment of acts of indecency with girls under 16), the Committee proceeded to deal with Clause 2, which prohibits under penalty sexual intercourse by a person suffering from venereal disease. The progress made with the consideration of the clause was not very great, and at the conclusion of the sitting the first subsection was still under examination. That subsection, as it was originally printed in the Bill, runs:—

A person who is suffering from venereal disease in a communicable form shall not have sexual intercourse with any other person or solicit or invite any other person to have such sexual intercourse.

An amendment was inserted in the subsection which provided that the person suffering from the disease should not only not have sexual intercourse with any other person, but should not "wilfully communicate such disease in any other manner to any person." Some discussion arose on the application of the penalties to solicitation by infected persons.—Answering Sir WILLIAM COLLINS, Sir GEORGE CAVE, the Home Secretary, said that he would ask the Committee to omit Subsection 3 from the Bill. That is the provision which runs:—

Where any person is convicted of any of the offences mentioned in the Schedule to this Act, the Court may, if they think fit, for the purpose of ascertaining whether that person is suffering from venereal disease in a communicable form, order that person to submit to such medical examination and tests as may be requisite for that purpose. If the person is a female, the examination and tests shall be conducted, if she so desires, by a female doctor.

He (the Home Secretary) thought that there were good reasons for inserting such a provision as this, but there was strong opposition to it. As it was thus shown to be controversial, he would not press for its insertion. The Committee left off its proceedings at this stage.

#### Pensions for Disabled Soldiers and their Dependents.

In the House of Commons on Tuesday a very detailed statement was made on the subject of pensions to disabled soldiers, and to soldiers' widows and dependents by Mr. BARNEs, the Minister of Pensions.<sup>1</sup> One other point which Mr. Barnes touched on is interesting to the medical profession. Power is to be taken under the Royal Warrant to retain a penny in each half-crown from the pension of any widow for any benefit which the Government may devise. If a scheme of medical benefit is devised (Mr. Barnes said) this would enable the Government to place the 400,000 women and children under the doctors' supervision. He intimated that he would be glad to have the mind of the House on the matter. F.W.

## HOUSE OF COMMONS.

WEDNESDAY, FEB. 28TH.

#### Health of Troops in East Africa.

Answering Mr. O'GRADY, Mr. MACPHERSON (Under Secretary for War) said: The composition of the East African Expeditionary Force has been varied from time to time according to the climatic and other conditions under which it was operating. It was long since recognised that in the event of the German forces retiring into the malarious south-eastern portions of their colony it would be desirable to reduce the number of white troops employed to a minimum. Steps were accordingly taken to provide coloured units to replace white. At the present moment the bulk of the white troops have been withdrawn or are in process of being withdrawn, whilst arrangements have been made to give other white units a period of rest and recuperation in a healthy climate. In regard to certain reports of the hardships undergone by the troops in East Africa which have gained currency, the following extract from a telegram from General Smuts may be of interest: "The complaints are exaggerated perversions of the admitted fact that the hardships have been unusually great in this campaign." The health and rationing of the troops and the provision of adequate transport, mechanical and other, is constantly engaging attention.

THURSDAY, MARCH 1ST.

#### The Health of the Army.

In the course of his speech introducing the Army Estimates, Mr. FORSTER (Financial Secretary to the War Office) said: While I am speaking of Mesopotamia, may I refer to a subject which engaged a deal of attention last year—namely, the condition of the Medical Service. Since the estimates were introduced last year, the War Office has become directly responsible for the medical arrangements in that theatre of war. We have received frequent reports from the medical and sanitary authorities of that force. The Special Sanitary Committee made an exhaustive examination of the conditions existing there, and the general conditions now existing may be regarded as fully satisfactory. During the summer there was necessarily some considerable sickness, but the admission ratio has steadily diminished since then, and I think the health of the Army at present may be considered satisfactory. An abundant supply of nurses and other medical personnel has been furnished in hospitals for that area. These hospitals have recently been visited by a representative from the War Office, who reports that they are not unequal to any of the hospitals which we have at the other fronts. In France, Salonika, and Egypt the general condition of affairs is satisfactory. A great strain has at different times been put upon the medical resources in the various theatres of war, but the difficulties have been met. We have had to contend with a good deal of malaria in East Africa owing to the exceptionally unhealthy climatic conditions in which we have had to carry on our operations. I think nothing in this war is more striking than the triumph of science over disease, wholly upsetting the experience of former wars.

#### Enteric Fever.

One of the most remarkable phenomena is the almost total disappearance of enteric fever, that dread scourge which in former wars has decimated our armies even more effectually than the efforts of the enemy. This is the more surprising when one considers the vast numbers of men, their density on the ground, and the poisoned condition of the soil, especially in France. I think it will interest the House if I give the last weekly returns from the various fronts of the numbers in hospital suffering from typhoid. In France there are 4 cases, in Salonika 9, in Egypt 3, and in Mesopotamia 3, making a total of 24. The number of cases of typhoid fever amongst British troops in France up to Nov. 1st last year was 1684, paratyphoid 2534 and indefinite cases 353, a total of 4571 cases of the typhoid group of diseases. Compare that with what happened in South Africa. In South Africa there were nearly 60,000 cases admitted to hospital and 8227 deaths. And the army in France is infinitely larger than was the army in South Africa. The admission ratio for typhoid fever amongst the troops in France who have not been protected by inoculation is 15 times higher than amongst those who have been inoculated and the death ratio 70 times higher. I think that the narration of figures like these bears eloquent witness to the debt which we owe to the medical service.

#### Hospital Services.

At home during the past year (Mr. Forster proceeded) a system of convalescent hospitals, command depots, and orthopaedic hospitals has been developed and extended. Arrangements have been made with the Ministry of Pensions by which the problem of the training and treatment of the discharged soldier will be more effectively dealt with, and arrangements have been made to link up the treatment in the military hospitals with that afforded to discharged

<sup>1</sup> This statement is summarised on p. 393.

soldiers on the out-patient system under the local committees of the Statutory Committee on War Pensions. The strain on the Medical Department in providing accommodation for the sick and wounded from the various fronts overseas has been very great, but we have received, and we continue to receive, the most valuable assistance from the voluntary hospitals which have been established throughout the country by persons to whom we are greatly indebted. The system of utilising the services of the members of the various Voluntary Aid Detachments has been highly successful. Those ladies serve abroad in large numbers and they are highly appreciated by members of the nursing profession. A system of Voluntary Aid hospitals has been invaluable in linking up the military medical system with the large number of sympathetic workers amongst the civil population, and I am glad to take this opportunity of saying how deeply indebted we are for the assistance we have received. The work of the British Red Cross Society is too well known to need any encomiums. The great resources of the society have been ungrudgingly placed at the disposal of the Medical Department on many occasions. A special committee has been recently established by that society, upon which are representatives both of the War Office and the Ministry of Pensions, for dealing with certain classes of disabled soldiers, such as neurasthenics, epileptics, and other cases requiring institutional treatment. This still further strengthens the link between the military hospitals and the civil institutions.

#### *Venereal Disease.*

I think it should be generally known that the venereal rate in the Army to-day is no higher than it is in ordinary times of peace. The absence of statistics for the general population in pre-war days renders it impossible to say whether the number of cases of venereal disease in the Army is higher than in a corresponding portion of the civil population of corresponding ages. We are making every effort to reduce the rate still lower. The National Council for the Control of Venereal Diseases has given us great assistance by providing lecturers specially chosen to lecture to troops in camps and barracks. These lectures have been largely attended and much appreciated.

Mr. TENNANT commented on the marvellous immunity of the Army from epidemic disease. "I think the House will agree," he added, "that the person more responsible than any other for the happy state of affairs is the Director-General of the Medical Services, Sir Alfred Keogh."

#### *R.A.M.C. Territorial Officers.*

Major WHEELER drew attention to the position of the junior officers of the Royal Army Medical Corps Territorial Branch. He gave figures relating to their pay in comparison with that of regular and temporary officers of the R.A.M.C. Both as to pay and conditions of service the officers of the Territorial Branch were at a disadvantage, and their case was worthy of the consideration of the War Office.

Mr. MACPHERSON (Under Secretary for War) announced that the Secretary for War had appointed a committee to inquire into the various anomalies of promotion, not only in the Territorial Force, but in the New Armies. He had no doubt that the point raised by the honourable and gallant Member concerning the Territorial R.A.M.C. men would be included in the terms of reference.

#### *Military Medical Boards and Classification of Recruits.*

Mr. NIELD moved—

That, in the opinion of this House, the classification of recruits for the Army by military medical boards, particularly of men who have been previously examined upon attestation under the Derby scheme and rejected as unfit, has been productive of great and unnecessary hardship as well as expense by reason of the large number of such men, while undergoing training, being found unable to perform the military work required of them in the class to which they have been assigned, whereby they have had to be sent for hospital treatment and have occupied accommodation and medical attendance urgently required for returned wounded men; and this House is of opinion that an inquiry is urgently needed to alter and standardise these medical examinations and to ascertain the extent to which hospital accommodation and expense has been expended which with proper care might have been avoided.

The honourable Member said that great waste was taking place in hospitals because men who were taken into the Army and had been unable to stand the strain of training had been relegated to hospitals and filled beds which were urgently wanted for wounded men. There was also the waste of man power occasioned by withdrawing men from civil occupations when they ought to be left in them. All over the country medical boards refused to re-examine attested men. The honourable gentleman went into great detail in individual cases, which, he said, showed laxity of the medical authorities under the tribunals scheme. He had a list of men who had been passed in certain categories in a way which no possible system could justify. He called particular attention to the case of men who were suffering from gastric trouble. He also referred to the careless

way in which he said some medical examinations were conducted.

Mr. SNOWDEN seconded.

Mr. MACPHERSON, in replying, said a million and a half men had probably been examined in a comparatively short time. It would have been exceedingly surprising if out of such a large number some mistakes had not been made. One per cent. of the number would amount to 15,000 cases, and he thought it might be safely said that mistakes had not been made in greater number than that. In fact, probably a less number had been made. Of course, to get out accurate statistics would cost an enormous amount of time and expense, but he was sure it would be found not only that the mistakes had been small in number, but, on the whole, recruiting medical boards had done extraordinarily well. The suggestion which pervaded the speeches of the two honourable members was that the military doctors were responsible. As a matter of fact, the boards in the main were composed of civilian practitioners belonging to the Territorial Force and the Special Reserve. He had taken 63 medical boards and had found that the proportion of civilian to military doctors was as two to one, and the proportion of civilian to military doctors would work out at a very much higher rate if it were not necessary to have a medical man of military experience as president of the Board. He must, therefore, deny that the R.A.M.C. doctors were responsible.

- Mr. SNOWDEN: I did not make that suggestion.

Mr. MACPHERSON went on to say that it had been stated that the medical men were receiving secret instructions from the War Office. That was rather a monstrous charge to make. They were professional men and in a great many cases were men of very high professional and social reputation. He could not imagine medical men of that status and character accepting secret instructions of any sort. He had a greater faith in the British medical practitioner. At the head of these boards was a distinguished practitioner, Colonel James Galloway. He was the man who was responsible for the conduct of the boards and his qualifications, as the House would appreciate, were very high. To suggest that he was in any way responsible for secret instructions to boards was stretching common-sense. The point had also been made that the re-examination of attested men was very unsatisfactory. There, again, when they were dealing with a specific case it was almost impossible to answer. In recent statistics he found in the time covered by the opening period of this year that in a total of 2000 only 13 broke down in training. This was certainly not a high percentage when the different classes from which the men were drawn and the training that was undergone were considered. He would engage to make all inquiries in the cases that had been submitted to him.

Mr. NIELD: Will the honourable gentleman regard gastric cases as a class apart and give special directions?

Mr. MACPHERSON: I will bring the cases mentioned before the proper authority.

The motion was withdrawn.

MONDAY, MARCH 5TH.

#### *Payments to Panel Practitioners.*

Mr. CHANCELLOR asked the representative of the National Health Insurance Commissioners whether he was aware that certain Insurance Committees declined to pay the balances due to practitioners in respect of the year 1915 unless a special form of receipt and discharge was signed; and whether, as these moneys were payable unconditionally, he would take steps to see that the doctors concerned should receive equitable treatment and thus, by assuaging irritation, lighten their burdens during the pressure of work consequent upon the depletion of their numbers through enlistment.—Sir E. CORNWALL replied: No particular form of receipt has been prescribed by the Commissioners, but I shall be glad to consider in any particular case which my honourable friend has in mind any proposals in this direction calculated to remove irritation or lighten the pressure of work falling upon medical men, especially in view of the depletion of their numbers.

#### *Brandy for Hospitals.*

Sir G. TOUCHE asked the representative of the Treasury whether he was aware that the application of the restrictions governing the withdrawal of spirits from bond was resulting in hardship in the case of hospitals, both military and civil, on account of the inability of retailers to supply the small quantities of brandy necessary for their consumption due to their inability to show an average, owing to their varying needs which were dependent on the nature of the cases under treatment, and that representations made on behalf of the Great Northern Central Hospital to the Customs authorities pointing out that their consumption was two gallons every ten days, that they were now using their last two gallons, and that their suppliers were unable to withdraw a further quantity from bond, only resulted in a promise to place the subject before the Board

with a view to an inquiry being held and a statement that some weeks might elapse before a decision was arrived at; and, in view of the fact that the application of the restrictions in such cases could not be in the public interest, and having regard to the necessity for the maintenance of an adequate supply of brandy for use in the treatment of wounded soldiers, would he take such steps as would procure a modification of the regulations in so far as they governed the supply of brandy to hospitals.—Mr. BALDWIN wrote in reply: The Board of Customs and Excise informs me that, while they can identify the case referred to, they had no knowledge that the situation was as described in the question. No representations have been made to them by the hospitals as to the effect upon them of the present regulations, but they are inquiring further into the case of this hospital.

TUESDAY, MARCH 6TH.

*American Medical Men.*

Answering Mr. R. LAMBERT, who asked whether the Army Medical Department would relax the rule which deprived them of the services of medical men holding American degrees, Mr. MACPHERSON (Under Secretary for War) said: The War Office is in constant touch with members of the medical profession. Duly qualified American doctors are being employed.

**Appointments.**

*Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

DUNCAN, D., M.B., C.M. Aberd., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Chester-le-Street District of the county of Durham.  
DYSON, WILLIAM, M.D. Vict., Dermatologist to the Salford Royal Hospital; GIBSON, ROBERT, M.D., Ch.B., to hold the office *pro tem.*  
MACALPIN, J. BARLOW, M.B., Ch.B. Vict., F.R.C.S. Eng., to take charge of the Genito-Urinary Department at the Royal Salford Hospital.  
MAGDONALD, M., M.D. Glasg., Acting Medical Officer of Health *pro tem.* to the Deptford Borough Council.  
MALLINICK, S., M.B.C.S. Eng., L.R.C.P. Lond., Assistant Tuberculosis Officer for the Cardigan and Middleton-in-Wharfedale Sanatoria.  
OLIPHANT, F. B., M.B., C.M. Edin., Certifying Surgeon under the Factory and Workshop Acts for the Bridport District of the county of Dorset.  
SMITH, F. L., M.D. Durh., Medical Officer of the Grimoldby District of Louth.

**Vacancies.**

*For further information regarding each vacancy reference should be made to the advertisement (see Index). When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.*

ASHTON-UNDER-LYNE, LANCS, DISTRICT INFIRMARY AND CHILDREN'S HOSPITAL.—Assistant House Surgeon. Salary £160 per annum, with usual emoluments.  
BIRMINGHAM AND MIDLAND EYE HOSPITAL.—Female House Surgeon. Salary £200 per annum.  
BIRMINGHAM GENERAL DISPENSARY.—Resident Medical Officer, unmarried. Salary £250 per annum, with apartments, &c.  
BRISTOL ROYAL HOSPITAL FOR SICK CHILDREN AND WOMEN.—Female House Surgeon. Salary £160 per annum, with board, &c.  
BRISTOL ROYAL INFIRMIERY.—House Physician and House Surgeon. Salary at rate of £120 per annum, with board, &c.  
BURNLEY UNION.—Resident Assistant Medical Officer. Salary £250 per annum, with rations, &c.  
BURNLEY, VICTORIA HOSPITAL.—House Surgeon. Salary £160 per annum, with board, &c.  
BURRY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.  
CAMBRIDGE, COUNTY MENTAL HOSPITAL.—First Assistant Medical Officer. Also Junior (Second) Assistant Medical Officer, unmarried. Salaries £200 and £200 respectively, with board, &c.  
CARLISLE, CUMBERLAND INFIRMARY.—House Surgeon. Salary £200 per annum, with board, &c.  
CHESTERFIELD AND NORTH DERBYSHIRE HOSPITAL.—House Surgeon. Salary £200 per annum, with board, &c.  
DEVONPORT, ROYAL ALBERT HOSPITAL.—Assistant House Surgeon, unmarried. Salary £150 per annum, with board, &c.  
GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon. Salary £250 per annum, with board, &c.  
LEEDS PUBLIC DISPENSARY.—Second Female Resident Medical Officer. Salary £200 per annum, with board, &c.

LIVERPOOL, BROWNLOW HILL INSTITUTION.—Resident Assistant Medical Officer. Salary at rate of £300 per annum, with rations, &c.  
MAIDSTONE, WEST KENT GENERAL HOSPITAL.—Senior House Surgeon. Salary £250-£300 per annum.  
MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Park-place, Cheetham Hill-road.—House Surgeon. Salary £120 per annum, with board, &c.  
NEWCASTLE UPON-TYNE EDUCATION COMMITTEE.—Temporary Assistant School Medical Officer. Salary £300 per annum.  
OLDHAM ROYAL INFIRMARY.—Second House Surgeon. Salary £250 per annum. Also Third House Surgeon. Salary £200 per annum. With board, &c.

PETERBOROUGH INFIRMARY.—House Surgeon. Salary £150 per annum for first six months, £200 after, with board, &c.

PORTSMOUTH ROYAL HOSPITAL.—House Surgeon for six months. Salary £250 per annum, with board, &c.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford.—House Surgeon. Also Casualty Officer.

READING, ROYAL BERKSHIRE HOSPITAL.—House Surgeon for six months. Salary £250 per annum, with board, &c.

ST. GEORGE'S HOSPITAL, Hyde Park Corner, S.W.—Lecturer on Mental Diseases.

SALFORD ROYAL HOSPITAL.—Junior House Surgeon. Salary at rate of £150 per annum, with board, &c.

SOUTHAMPTON BOROUGH ISOLATION HOSPITAL.—Resident Medical Officer. Salary £200 per annum, with board, &c.

SOUTHAMPTON, ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL.—House Physician and Junior House Surgeon. Salaries £150 and £120 per annum respectively, with board, &c.

SUNDERLAND ROYAL INFIRMARY.—Female House Surgeons. Salaries—Senior, £250; Junior, £200 per annum, with board, &c.

WARRINGTON INFIRMARY AND DISPENSARY.—Senior and Junior House Surgeons. Salary £200 and £150 per annum respectively, with board, &c.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of a vacancy for a Certifying Surgeon under the Factory and Workshop Acts at Gravesend.

**Births, Marriages, and Deaths.****BIRTHS.**

COWEN.—On March 1st, at Imperial-terrace, Blackpool, the wife of Captain E. G. H. Cowen, R.A.M.C., of a son.

DICKSON.—On March 4th, at Nelson Place, Newcastle, Staffordshire, the wife of Robert H. Dickson, F.R.C.S.—a son.

FITZGERALD.—On March 1st, at St. Margaret's, Ashburnham-gardens, Eastbourne, the wife of Captain R. Desmoden Fitzgerald, R.A.M.C., of a son.

GARDNER.—On March 2nd, at Albert-road, Whalley Range, Manchester, Muriel, wife of Lieutenant A. Linton Gardner, R.A.M.C., of Watermead, Ilfracombe, of a son.

JOHN.—On Feb. 25th, at "Tandderwen," Old Colwyn, to Katharine (née Spencer), the wife of Captain R. B. John, R.A.M.C.—a son.

**MARRIAGES.**

CADDELL—WHELAN.—On Feb. 22nd, at the Chapel Royal, Savoy-Captain (Acting Lieutenant-Colonel) E. D. Caddell, M.B., M.C., R.A.M.C., to Margaret Frances, only daughter of Mr. and Mrs. C. Pratt Whelan, Allesbury-road, Dublin, and Rochfort, Greystones, Co. Wicklow.

FARNFIELD—WINDSOR-WATSON.—On Wednesday, March 7th, 1917, at All Souls', Hastings, by the Rev. H. Collinson, B.A., John Stewart Farnfield, M.R.C.S., L.R.C.P., London, to Annabel Windsor-Watson, widow of John Watson, solicitor, Liverpool.

**DEATHS.**

MAJOR, HARRY PIKE, M.R.C.S., L.S.A., M.D. St. And., aged 80 years (retired), Justice of the Peace for Berks.

POYNTE-WRIGHT.—On Feb. 25th, at St. Neots, Thomas Poyntz-Wright, M.R.C.S.E., L.S.A. Lond., for 30 years M.O.H. for St. Neots and District, in his 80th year.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

**BOOKS, ETC., RECEIVED.**

BAILLIÈRE, J. B., ET FILS, Paris.

Le Pratique Chirurgicale dans la Zone de l'Avant. Par le Médecin Inspecteur Général Mignon, Médecin d'Armée le Dr. Billet, Professeur agrégé au Val-de-Grâce, et le Dr. Henri Martin, chargé de la réunion des documents photographiques. 10 fr.

BOERICKE AND TAFEL, 1011, Arch-street, Philadelphia, Pa. Clinical Gynecology. By James C. Wood, A.M., M.D., F.A.C.S., &c. \$2.00 net.

CHURCHILL, J. AND A., London.

Minor Surgery and Bandaging (Heath, Pollard). Sixteenth edition. By H. Morrison Davies, M.D., M.C. Cantab., F.R.C.S. 8s. 6d. net.

LEA AND FEBIGER, Philadelphia and New York.

Syphilis. By Loyd Thompson, Ph.B., M.D. \$4.25.

LONGMANS, GREEN, AND CO., London. Physiology of Food and Economy in Diet. By W. M. Bayliss, M.A., D.Sc. Oxon., F.R.S., &c. 2s. net. Non-Flesh Receipts. By Margaret Blatch, M.C.A. Second edition. 1s. 6d. net.

MASSON ET CIE, Paris.

Localisation et Extraction des Projectiles. Par Ombréanne, Professeur agrégé à la Faculté de Paris, et Ledoux-Lebard, Chef de Laboratoire de Radiologie des Hôpitaux de Paris. 4 fr.

Traitemenit des Fractures. Tome II.: Fractures Diaphysaires. Par R. Leiche, Professeur agrégé à la Faculté de Lyon. 4 fr.

La Prothèse des Amputés. Par A. Broca, Professeur à la Faculté de Médecine de Paris, et Ducrocq, Chirurgien à l'Hôpital Rothschild. 4 fr.

Le Syphilis et l'Armée. Par G. Thibierge, médecin de l'Hôpital Saint-Louis. 4 fr.

Hystérie-Pithiatisme et Troubles nerveux d'ordre réflexe. Par J. Babinski, Membre de l'Académie de Médecine, et J. Froment, agrégé, Médecin des Hôpitaux de Lyon. 4 fr.

## Notes, Short Comments, and Answers to Correspondents.

### FERNS AS A SOURCE OF STARCH.

To the Editor of THE LANCET.

SIR.—With reference to the annotation in THE LANCET of Feb. 24th and Professor A. E. Shipley's suggestion regarding the use of the rootstock of the common brake (*Pteris aquilina*) as a possible source of starch for food and industry, there seems to be some doubt as to its capabilities in these directions, judging by the remarks of various writers. The best account I have been able to find is in "The Ferns of Great Britain, &c.," by Anne Pratt (Mrs. John Pearless in 1866), as follows:—

The ancients are supposed to have used both the fronds and stems of the Brake in diet-drinks, and medicine, for many disorders have, at various times, been made in our country from this fern. It is very astringent, and has been recommended for dressing and preparing kid and chamois leather; while both in this and other lands the ashes, from the alkali which they contain, were found serviceable in the manufacture of soap and glass until discoveries in chemistry suggested the use of other materials for the purpose. This very astringency seems to render the Brake unsuitable for the food of man, though some writers think that nutriment would be afforded by its large rhizome. This is often ground to powder and mixed with the flour in bread eaten in some parts of Normandy; but, perhaps, like the admixture of pine bark with the flour used in some countries in the north of Europe, it adds rather to the quantity than to the nutritious quality of the bread. The rootstock of this brake, however, as we are informed by Humboldt, serves the inhabitants of Palma and Gomera, in the Canary Islands, for food. They grind it, he says, to powder and mix it with a small quantity of barley-meal. This composition is termed "*gofio*"; and the author adds that the use of so homely a diet is a proof of the extreme poverty of the people of these islands. This naturalist saw both the Brake and our common Northern Hard Fern growing in the Canaries in great luxuriance, though never attaining the size or stateliness of the arborescent forms of Equinoctial America. Tree ferns frequently afford food to the natives of the lands in which they are found. Dr. Joseph Hooker, in his recent "Himalayan Journal," says that ferns are more commonly used for food than is supposed. He tells us that both in Sikkim and Nepal the watery tubers of an *Aspidium* are eaten. So, also, the pulp of one tree-fern affords food, but only in times of scarcity, as does that of another species in New Zealand, *Cyathea medullaris*. Their pith is composed of a coarse sago—that is to say, of cellular tissue with starch granules. The Esculent Brake (*Pteris excelsa*), a fern very similar to our Bracken, is a very troublesome plant to the agriculturist in his attempt to clear the land in New Zealand, and Polack calls it "the interminable fern-root." The rootstock is much used by the natives as food, as it is also in the Society Islands and in Australia, where it is the most extensively diffused edible root. In the latter country this plant is called *Tara* by the aborigines, a name which in the southern hemisphere is given to several roots which are eaten, and also to rice. Mr. Backhouse states, with some of the natives of Australia, the meal made of the inner portion of the upper parts of a tree-fern. He says that it was too astringent to be agreeable to his palate, and little improved by cooking, but that it was something like a Swedish turnip in substance.

The fronds have been used in the manufacture of beer and are still used as packing material for fruit, keeping it fresh and cool and imparting neither colour nor flavour; but in the "Diary of Henry Machyn, Merchant Taylor of London," written in 1552, we read of a wicked man who was placed in the "pelere" for "selling pots of strawberries, the whiche the gott was not alif fulle, but filled with forne."

I am, Sir, yours faithfully,

London, March 3rd, 1917.

PTERIS.

**PRUDENTIAL ASSURANCE COMPANY, LIMITED.**  
THIS company has just issued its sixty-eighth annual report for the year ending Dec. 31st, 1916. The assets of the company in all branches as shown in the balance-sheet are £99,123,746, being an increase of £4,328,948 over those of 1915. Of these assets over £17,750,000 are in British Government securities; this represents an increase compared with last year of about £4,500,000. During the year the company has lent or sold to the Treasury under the various mobilisation schemes securities of a nominal value of £6,955,159, and in the same time the Government has continuously availed itself of the services of the company and its officials, and the report states that it has been a matter for congratulation that the services so rendered have met with the greatest appreciation. The indoor and outdoor staffs have been further depleted during the year by naval and military demands, and the company is now supplying more than 10,000 men to the fighting strength of the nation. The directors record their admiration of the spirit with which the staff, male and female, have carried on the business of the company, a task which the war has rendered difficult of accomplishment. The Prudential Voluntary Aid Detachments of the Red Cross Society have continued their work throughout the year; the number of casualties met at the various railway stations and conveyed to London homes and hospitals have now reached a total of 156,000. Two

motor ambulances were purchased by the voluntary subscriptions of the outdoor staff of the company and presented to the Red Cross, and a motor omnibus was presented by Mr. Thomas Wharrie, whose death, after 24 years' continuous service on the board, the directors deplore. The board propose to fill the vacancy by the appointment of Mr. Alfred Corderoy Thompson, who has served the company for nearly 45 years and who has held the office of manager since 1907. The directors desire that he should retain his present office of general manager, which will necessitate an alteration in the articles of association of the company. The war claims during the year in both the ordinary and industrial branches number 52,433, and amount to £1,077,568. The total paid up to the present on this account since the outbreak of war exceeds £1,850,000 in respect of over 88,000 claims. The strain imposed upon the company by the operation of the Courts (Emergency Powers) Act and the necessity of reserving funds to meet the liabilities which this Act creates and other strains owing to war have reduced the surplus shown on the financial operations of the year, and profit-sharing schemes have either had to be temporarily suspended or modified. Mr. J. Burn, actuary, in his valuation report states that the war claims of the year have been very heavy, the amount paid in the industrial branch being almost double that paid in the previous year. He also emphasises the strain imposed by the Act referred to as "a severe burden upon the company's resources."

### THE PRICE OF FISH.

To the Editor of THE LANCET.

SIR.—I do not propose to comment on the price of fish generally, but to compare the values and prices of two favourites with many less wealthy folk. These favourites are bloaters and fresh herrings and, on Sundays especially, winkles (if a winkle is a fish, a point which I seem to recollect a learned judge could not decide; to some it is a contemptible sea-snail). Winkles are now in London 4d. a pint (except in the very poorest districts, where they are 2d.). I bought a pint and obtained 154 shells, weighing 19 oz. The empty shells weighed 15*1*/<sub>2</sub> oz. and the actual winkles 3*1*/<sub>2</sub> oz. This equals 1*1*/<sub>2</sub> d. per pound for winkles, or just over 1d. an ounce. (Before the war winkles in shells were 2d. a pint, equal to 8*1*/<sub>2</sub> d. a pound for the yield.) I bought two bloaters costing the same money as the winkles, 4d. (2d. each). They weighed, with heads on, 10*1*/<sub>2</sub> oz. and without heads 8*1*/<sub>2</sub> oz. This equals 7*1*/<sub>2</sub> d. a pound for bloaters. I also bought two fresh herrings costing the same money, 4d. (2d. each). They weighed, with heads on 9*1*/<sub>2</sub> oz. and without heads 8 oz. This equals 8d. a pound, or 4d. an ounce. Winkles are therefore proved to be double the price of bloaters or herrings, if considered as food. Some people may argue that they are a relish used in place of jam, but plum jam is 8d. a pound and strawberry, 10*1*/<sub>2</sub> d., as against 1*1*/<sub>2</sub> d. for winkles, which even at the lowest price, 2*1*/<sub>2</sub> d. a pint, now current, work out at 1*1*/<sub>2</sub> d. a pound. Sixty-five years ago a Fellow of the Statistical Society (Mr. Braithwaite Poole) estimated that Billingsgate Market sold in a year 304,000,000 winkles, weighing 1900 tons, with a value of £15,000. Food experts have ignored the winkle (and the cockle) as of little account as food, but that was when plenty reigned.

I am, Sir, yours faithfully,

OBSERVER.

### FALKLAND ISLANDS.

THE Blue-Book of this colony for 1915 gives the estimated population as 3451—2519 males and 932 females. The birth-rate per 1000 during the year was 13.37 and the death-rate 8.13. The general health was good on the whole, but that of the workmen imported into Stanley from England for special work was less satisfactory, the chief illnesses among them being bronchitis, rheumatism, and enteritis; many cases of the last were probably due to excessive meat-eating, to which the majority of the men were not accustomed. An epidemic of a peculiar kind occurred during July, August, and September and resulted in five deaths; the symptoms simulated very closely those of beri-beri; no cases occurred in Stanley. The King Edward VII. Memorial Hospital was opened as a civil hospital in May; 21 cases were admitted to the institution during the year.

### POTATOES.

To the Editor of THE LANCET.

SIR.—With reference to Captain Bathurst's warning in the House of Commons yesterday that there will probably be no potatoes at all for sale during the late spring and early summer, and his added appeal to those able to buy more expensive substitutes to do so at once, and thus to make the supply last longer for their poorer brethren, may I recommend the following method to make the potatoes go further and to comply with the appeal? Boil two or three tablespoonfuls of ordinary rice (in a cloth preferably) in order not to make the rice too watery, allowing

room in the cloth for the expansion of the rice grains) about an hour before one pound of potatoes are put on to cook. When the potatoes are boiled, mash them, and add the rice which has been boiled soft, and mix well together. Three people out of four who were served with this mixture did not know until afterwards that they had not eaten solely mashed potatoes. 3d. a pound was paid for the rice, which was of the small variety, but nice and white. Not much rice to the pound of potatoes is required, as the rice grains swell up considerably. Personally I can recommend it.

London, March 6th, 1917. 1 am, Sir, yours faithfully,

W.

#### THE STICK CRUTCH FUND.

A DEPOT of this Fund has been opened at 30, Regent-street, W., for supplying, free of charge, stick crutches to wounded soldiers discharged from the Army. The office is open from 11 A.M. to 4 P.M. each week-day with the exception of Saturdays.

## Medical Diary for the ensuing Week.

### SOCIETIES.

#### ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W. MEETINGS OF SECTIONS.

Tuesday, March 13th.

**PSYCHIATRY** (Hon. Secretaries—Bernard Hart, G. F. Barham):  
at 6.30 P.M.  
*Communications:*  
Dr. Laura Foster: Histological Examination of the Ovaries in 100 Cases of Mental Disease and Normal Controls.  
Staff-Surgeon M. Kojima, I.J.N.: Studies on Endocrine Organs of Dementia Praecox.  
(Communicated by Major F. W. Mott, who will demonstrate the histological observations.)

Wednesday, March 14th.

**SURGERY** (Hon. Secretaries—Raymond Johnson, V. Warren Low):  
at 6.30 P.M.  
*Paper:*

Major Jocelyn Swan: The Treatment of Severely Infected Gunshot Fractures involving the Joints of the Upper Extremity: Early Excision with the object of obtaining Mobility (with epidiascope demonstration of radiograms, &c.).

Thursday, March 15th.

**DERMATOLOGY** (Hon. Secretaries—J. H. R. McDonagh, Henry MacCormac): at 5 P.M.  
*Cases* (at 4.30 P.M.).

Dr. Pernet: (1) A Case of Morvan's Disease (Syringomyelia); (2) A Case of Elephantiasis of the finger; (3) A Case of Nævus of the temple; And other cases.

Friday, March 16th.

**ELECTRO-THERAPEUTICS** (Hon. Secretaries—E. P. Cumberbatch, R. Knox): at 8.30 P.M.  
*Address:*

Professor W. M. Bayliss, F.R.S.: The Origin of the Electric Currents led off from the Human Body.

#### MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.

**MONDAY**.—8.30 P.M.: *Paper*:—Major Sir Robert Armstrong-Jones, R.A.M.C.: The Psychology of Fear and the Effects of Panic Fear in War Time.

**RUMINIAN SOCIETY**, at the Royal Society of Medicine, 1, Wimpole-street, W.

**WEDNESDAY**.—9 P.M.: *Paper*:—Mr. C. Heath: Diagnosis and Treatment in Otitis Media.

### LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

#### ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East.

**TUESDAY AND THURSDAY**.—5 P.M.: Lumleian Lectures:—Dr. G. A. Sutherland: Modern Aspects of Heart Disease. (Lectures I. and II.)

#### POST GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

**MONDAY**.—2 P.M.: Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

**TUESDAY**.—2 P.M.: Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

**WEDNESDAY**.—10 A.M.: Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M.: Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

**THURSDAY**.—2 P.M.: Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

**FRIDAY**.—10 A.M.: Dr. Simson: Gynaecological Operations. 2 P.M.: Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

**SATURDAY**.—10 A.M.: Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M.: Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

#### NORTH EAST LONDON POST GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

**MONDAY**.—Clinics:—10.30 A.M.: Surgical Out-patients (Mr. E. Gillespie). 2.30 P.M.: Medical Out-patients (Dr. T. R. Whipham):

Gynaecological Out-patients (Dr. Banister). 3 P.M.: Medical In-patients (Dr. R. M. Leslie).

**TUESDAY**.—2.30 P.M.: Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M.: Medical In-patients (Dr. A. J. Whiting).

**WEDNESDAY**.—Clinics:—2.30 P.M.: Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M.: Eye Operations (Mr. R. P. Brooks).

**THURSDAY**.—2.30 P.M.: Gynaecological Operations (Dr. A. B. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M.: Medical In-patients (Dr. R. M. Leslie).

**FRIDAY**.—2.30 P.M.: Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. E. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

#### THE THROAT HOSPITAL, Golden-square, W.

**MONDAY**.—5.15 P.M.: Special Demonstration of Selected Cases.

**TUESDAY**.—6.15 P.M.: Clinical Lecture.

#### ROYAL INSTITUTE OF PUBLIC HEALTH, Lecture Hall of the Institute, 37, Russell-square, W.C.

Course of Lectures and Discussions on Public Health Problems under

War and After-war Conditions:

**WEDNESDAY**.—4 P.M.: Lecture IX.:—Dr. H. L. Collis: The Protection of the Health of Munition Workers. Dr. H. M. Vernon, Mrs. H. J. Tenant, and Mr. G. Bellhouse have promised to take part in the discussion.

### EDITORIAL NOTICES.

IT is most important that communications relating to the Editorial business of THE LANCET should be addressed exclusively "To the EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET should be addressed "To the Manager."

We cannot undertake to return MSS. not used.

Offices: 423, STRAND, LONDON, W.C. 2.

### MANAGER'S NOTICES.

#### VOLUMES AND CASES.

VOLUMES for the second half of the year 1916 are now ready. Bound in cloth, gilt lettered, price 16s., carriage extra.

Cases for binding the half-year's numbers (inland edition) are also ready. Cloth, gilt lettered, price 2s., by post 2s. 4d.

To be obtained on application to the Manager, accompanied by remittance.

#### ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the new year, the price was raised to 8d. The rates of subscription remain as revised in October.

#### TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C. 2, are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and not to THE LANCET Offices.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

THE COLONIAL AND FOREIGN EDITION is published in time to catch the weekly Friday mails to all parts of the world.

#### TO COLONIAL AND FOREIGN SUBSCRIBERS.

Subscribers abroad are particularly requested to note the rates of subscription given on page 6.

The Manager will be pleased to forward copies direct from the Offices to places abroad at the rates shown, whatever be the weight of any of the copies so supplied.

## METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Mar. 7th, 1917.

Date.	Rain-fall.	Solar Radio in Vaneo.	Maximum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
Mar. 1	...	61	47	41	41	42	Overcast
" 2	...	47	43	41	40	41	Overcast
" 3	0.05	55	40	36	35	36	Overcast
" 4	0.15	64	44	33	33	35	Cloudy
" 5	0.03	42	41	34	34	34	Snowing
" 6	...	53	43	34	37	37	Overcast
" 7	...	62	35	31	30	31	Overcast

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

The following journals, magazines, &c. have been received:—  
*Annales de Médecine, Revista da Medicina, Asylum News, Tropical Diseases Bulletin, Indian Medical Journal, Practitioner, Edinburgh Medical Journal, Calcutta Medical Journal, American Journal of Surgery, Brain, Annales d'Igiene, American Medicine, British Dental Journal, Dublin Journal of Medical Science, Dominion Medical Monthly.*

## Communications, Letters, &amp;c., have been received from—

- A.—Dr. W. F. Annand, Coventry; Messrs. Armour and Co., Lond.; Dr. D. H. Anklesaria, Ahmedabad; Armenian Red Cross Refugee Fund, Lond.; Hon. Sec. of A.G.; Capt. J. E. Adams, R.A.M.C.(T); Lieut.-Col. W. Alpin, I.M.S.; Messrs. Adlard and Son, and West and Newman, Lond.; *American Journal of Electrotherapeutics and Radiology*, New York, Business Manager of.
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## The Lumleian Lectures

ON

### MODERN ASPECTS OF HEART DISEASE.

Delivered before the Royal College of Physicians of London

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#### LECTURE I.

Delivered on March 15th.

MR. PRESIDENT AND GENTLEMEN.—The pleasure with which I received the great honour of an invitation to deliver these lectures was considerably diminished by the difficulty in selecting a subject. Even when a subject was selected the further problem arose as to how it was to be dealt with. In this dilemma I turned to one of my distinguished predecessors, Sir Douglas Powell, who said: "It is one of the functions of the Lumleian lecturer to review from the side of experience and clinical observation the net results of most recent researches, and to show how far they should influence us in our daily practice." This is the one and only function which I shall attempt to perform in considering some modern aspects of heart disease. Perhaps you will kindly make allowance for the difficulties which surround any attempt to do justice to such a subject at a time when other thoughts and other occupations fill our days.

#### RECENT ADVANCES IN CARDIOLOGY.

To many of us it has been made clear that within recent years there has been a revolution in the domain of cardiology—not a destructive revolution but a constructive one. It has really consisted in the filling-in of many gaps in our previous knowledge. Just as our predecessors were hampered by these gaps, so their completion has led to a great advance in our understanding of the subject. Exact knowledge has led to more accurate clinical diagnosis and to better therapeutic results.

Naturally there were pioneers in this work. It must be a matter of satisfaction to all in this country to recognise that British workers have been the chief pioneers. The two names that appear to me most entitled to honour are those of W. H. Gaskell and James Mackenzie. The physiological work of Gaskell gave to us much information as to the mechanism of the heart beat, the various functions of the cardiac muscular tissues, and the effects produced on them by injury or electrical stimulation. Gaskell thus fashioned the key which was to unlock the door to many cardiac problems. The key, however, lay unused until Mackenzie after strenuous work succeeded in fitting it to the lock. Probably there is no better example of the valuable assistance which experimental physiology has given to clinical medicine than the combined work of Gaskell and Mackenzie. All present workers in the field of cardiology must acknowledge their indebtedness to these two scientists, who not only laid the foundations but raised a superstructure to which comparatively little has been added.

#### The Functions of the Heart.

It must be admitted that the additions to our knowledge of the physiological and pathological action of the heart have greatly increased the complexity of the problems which are presented clinically. Roughly, we may say that the problems as viewed by our predecessors were concerned with the heart as a simple organ, with one function—contractility, and with two supplying nerves—the vagus as a depressor and the accelerans for stimulation. Now we have to deal with the heart as an organ of four chambers and four walls, and the action of each of the four muscular walls has to be differentiated as far as possible. This has not been finally accomplished, but by means of the polygraph and the electro-cardiograph Mackenzie and Lewis have made wonderful progress in this differentiation. The functions of the heart to be considered, in addition to contractility, are rhythmicity, excitability, conductivity, and tonicity. Formerly these were physiological terms merely, associated

with experimental work, but not bearing on clinical medicine. Now these functions are investigated at the bedside and their disturbances have come to occupy a most important place in connexion with diagnosis and treatment. The vagus and accelerans nerves are not directed to the heart as a whole, but seem to exercise a controlling influence on each of the functions of the muscular tissue of the heart, so that the specialised tissues for contractility, conductivity, excitability, rhythmicity, and tonicity may be regarded as under nervous influence.

As we study the discoveries which have been made as to the extreme complexity of the cardiac mechanism we are led to ask how this machine is controlled and how far it can be influenced by human interference. The physiological working of the heart suggests that it is an automatic organism, self-starting, self-acting and effective in carrying on the circulation. Even in diseased conditions we see the power of the heart to overcome difficulties in its own way, as in the case of valvular lesions. How little influence our therapeutic measures have in the compensatory changes which the heart develops in the presence of a valvular lesion! By reason of its automatic action the cardiac machine is also protected from many of those disturbances to which other organs in the body are subject. It may be a matter of consolation to some of us when we think of the large amount of "cardiac stimulants" and "cardiac tonics" which, with misdirected energy, we have levelled at the heart, it may be a consolation to think that after all they never reached the heart and never disturbed its automatic action. This point of view, that the heart in health and disease is an automatic organ very capable of doing its own work if undisturbed, may prove of some use in regulating our therapeutic measures.

As regards the exact amount of regulation or control which is exercised over the heart by the vagus and accelerans nerves our information is still very incomplete. A useful simile is that which compares a horse and its rider with the heart and its nerve-supply. A horse can go on very well without its rider, but with a rider its actions are controlled and regulated if necessary. It has been shown that it is not the heart as a whole that is under the control of the vagus, but the individual functions of the heart. So that not only have special areas of the cardiac muscular tissue developed special functions for the harmonious movement of the heart, but these areas, or the functions of these areas, have also been placed under nervous control. One may assume that circulatory difficulties in the heart (for example, valvular) or in the circulation (for example, arterial) may be met successfully by the automatic cardiac mechanism. But disturbances also reach the heart from without and through the nervous system. For instance, in the case of excitement the heart-rate is at once increased. It may be suggested that in such cases the controlling nerves of the heart step in and regulate the functions, so that the successful carrying on of the circulation is not interfered with.

#### The Chambers of the Heart : Junctional Tissues.

In former times and for clinical purposes the heart was viewed as consisting of two parts, the right heart (right auricle and ventricle) and the left heart (left auricle and ventricle). In connexion with diseased conditions the terms "right-sided failure" and "left-sided failure" were in common use. Clinically it will be found that a better division of the heart would be into an auricular part (the two auricles) and a ventricular part (the two ventricles). The auricles work together, suffer together, give rise to disturbances together, and fail together. Similarly the ventricles act together. While under conditions of health the auricles act as aids to the ventricular functions, in diseased conditions they may seriously hamper those functions. There is a third portion of the heart of great clinical importance known as the junctional tissues. This is a bridge between the auricles and ventricles formed by the auriculo-ventricular node and the auriculo-ventricular bundle. It aids the cardiac mechanism when the auriculo-ventricular action is harmonious, and it tends to control the effects of the disturbance when the action is not harmonious.

There is one further distinction to be recognised in the muscular tissues of the heart—namely, between those whose function is primarily and essentially that of contraction, and those differentiated for the purpose of excitability, impulse discharge, and conductivity. Commencing at the sino-auricular (S.-A.) node, extending over the auricles (by a path

not yet defined),<sup>1</sup> forming the auriculo-ventricular (A.-V.) node and the auriculo-ventricular (A.-V.) bundle, we find a continuous strand of differentiated muscular tissue dealing with these special functions and not with contractility. As the branches of the auriculo-ventricular bundle penetrate to the remotest parts of the ventricles they are in a sense part of the muscle of the ventricles. But in the main function of the ventricles—contractility—they take no part. So that when we speak of supraventricular tissues clinically we include the auriculo-ventricular bundle as it takes no part in the muscular contraction of the ventricles.

#### *Estimation of Importance of Cardiac Lesions.*

It is useful in the case of an organ like the heart, which is subject to various diseases and disturbances, to have some standard by which to estimate the importance of the cardiac lesions. In the past attention has been largely concentrated on valvulitis as the predominating disease of the heart, and on murmurs as the evidence of valvular lesions. Students learned to classify cases according to the valve affected, mitral disease, aortic disease, &c., and proceeded later in their practice to carry out the treatment indicated in the text-books for the form of valvular disease present. It may be said that the best writers and teachers held no such limited views. References will certainly be found to changes in the myocardium, to dilatation and hypertrophy, and to irregularities of the heart. These, however, occupied a very subsidiary place, and the effect of their teaching and writing was to impress permanently on the student the idea that valvulitis is the important lesion in organic heart disease, and that prognosis and treatment are to be based on the valvular lesion present.

The fact that the heart is essentially a muscular organ, a force-pump, has long been recognised, but it is only recently that the great importance of disease of the myocardium has been emphasised. Heart disease may be summed up as a disturbance of the driving power of the cardiac muscle. Attention therefore may well be directed to the effect which disease processes have on the heart muscle. Gaskell and other physiologists have been struck by the wonderful mechanism by means of which any irregularity of heart beat experimentally induced is more or less corrected before the ventricular contraction occurs. He found that the main factor in the maintenance of cardiac efficiency is the securing of a regular ventricular beat. We may apply this in clinical medicine and say that the effect of cardiac disease is to be estimated by the extent to which ventricular action is affected. In disease we find that the action of the auricles can be dispensed with without failure of the circulation, and as regards the right ventricle any weakness there is chiefly of importance because of its effect on the action of the left ventricle. So we reach the conclusion that whatever the disease or disturbance present the important point to be considered is its effect on the driving power of the left ventricle.

In dealing with cases clinically, a standard such as this—the amount of interference with the action of the left ventricle—will be found useful in connexion with all forms of structural disease, valvular or myocardial; with all irregularities associated with myocardial changes; with all excessive changes in rate, be it very much increased or very much decreased; with the subjective symptoms and objective signs of cardiac weakness and cardiac failure; and very especially in connexion with the whole question of treatment. It may be said that our knowledge of the exact processes of disease is not yet full enough and precise enough to allow of the adoption of any such standard. But it is the recent advances in our knowledge which have made such a standard possible. It is the precision of knowledge gained through such instruments as the polygraph and electro-cardiograph, which has made possible the recognition of many influences, hitherto unsuspected, which act upon, and interfere with, the ventricular contractions. Of this examples will be given later. No doubt further progress will be made on the same lines, but it is useful meantime to have a working standard which will not play us false.

#### *VALVULITIS AND VALVULAR LESIONS.*

The view that valvulitis is the central factor in heart disease has proved misleading. Attempts were made to

<sup>1</sup>"The exact morphological connexion between the sinus node and the auriculo-ventricular node has not been definitely established" (Wiggers).

explain cardiac failure on a valvular basis by means of theories, supported often by great authorities, but not supported by much evidence. The theory of back pressure was held to be the explanation of cardiac failure in such different lesions as mitral stenosis, mitral regurgitation, and aortic regurgitation. The common signs of cardiac failure are familiar to all—namely, great dyspnoea, cyanosis, oedema, engorged liver, and oliguria. The explanation given was that the blood was either dammed back (mitral stenosis) or thrown back (mitral regurgitation), and that great back pressure in the venous circulation resulted. Hence came failure of the right side of the heart and also the so-called "failure of compensation."

In this connexion it is to be noted that all the phenomena of cardiac failure from "back pressure" can arise and do arise when a previously healthy heart is affected with the condition known as paroxysmal tachycardia. The valves may be normal, the myocardium may be healthy, but if the attack is sufficiently prolonged all the phenomena of "back pressure" may develop.

It is also to be noted that similar signs of heart failure may appear in many forms of chronic heart disease in the absence of any valvular lesion. The condition may end fatally, and after death no trace of valvulitis is to be found.

Further, we find clinically that urgent symptoms of cardiac failure may arise suddenly in cases of valvular disease without any apparent cause. The common and typical example is the development of auricular fibrillation in mitral stenosis. Here there is no sudden increase in back pressure, no alteration in the state of the diseased valve, but there is a sudden alteration in the rhythmic action of the heart which seriously affects the action of the left ventricle.

It is also to be observed that in the case of the gradual development of signs of cardiac failure in chronic valvular disease there is no evidence that the "back pressure" has been increased, or that the valve has become more inefficient. After 10 or 20 years the giving out of a heart with valvular disease is to be traced to something different from back pressure. Surely, if all the phenomena formerly associated with "back pressure" and the presence of valvulitis may arise when there is no back pressure and no valvulitis, some other explanation of the origin of these phenomena is called for.

The really important factor in all these cases would appear to be that the driving power of the left ventricle has given out, or that its efficiency has been interfered with by some superadded complication. It may be exhaustion from overwork, or from a defective blood-supply, or from the development of an abnormal rhythm, or from a great increase in rate. In all cases the signs of cardiac failure are brought about by a diminution of the forward pressure exerted by the left ventricle, and not by any form of increased back pressure. Such an explanation will at least meet most of the difficulties which the "back pressure" theory left unsolved. In using the term failure of compensation, which formerly had rather a hazy meaning, we ascribe the failure to the left ventricle, and we do not rest satisfied in the matter of diagnosis until we make out why it is that the ventricle has been rendered less efficient as a contractile organ.

Another point about valvular lesions, which are to be recognised by the accompanying murmurs, is that these murmurs may disappear or be replaced by others, or be much modified under certain conditions associated with cardiac failure. If the heart is beating rapidly an aortic regurgitant murmur may become inaudible for the time being. If the left ventricle is much dilated there may be audible only one murmur, that of mitral regurgitation, and this may be dependent on dilatation and not on disease of the mitral orifice. Perhaps the most striking example is the disappearance of the presystolic murmur of mitral stenosis when auricular fibrillation develops. The conditions under which the murmur or murmurs may disappear are often those which lead to the development of severe cardiac symptoms and the call for medical help. So that the physician who is dependent on valvulitis as his criterion will find that his guide has failed him at the critical moment.

None the less valvular lesions are sufficiently serious in themselves, and sufficiently important from a diagnostic point of view, to demand careful study. Our object is to determine not only what valvular lesion is present, but what

effects of the lesions the patient is suffering from. The effects will be found very closely associated with the reaction of the lesion on the ventricles, sometimes the right ventricle, but much more frequently the left. Suppose that an aortic regurgitant murmur is heard. This denotes a reflux of blood into the ventricle after each systole. The murmur may be loud, but the reflux may be small. If we find no change in the size or impulse of the left ventricle, we are justified in assuming that the reflux is small in amount. The pulse will not be collapsing and the blood pressure will not be raised in systole and lowered in diastole as a result of the valvular lesion. Suppose, on the other hand, we find a collapsing pulse, and a high systolic blood pressure with a low diastolic pressure, as a result of this aortic lesion, we shall expect to find evidence of dilatation and hypertrophy of the left ventricle, and finding that we shall conclude that the amount of blood regurgitated is considerable. Similarly, the symptoms complained of by the patient, and any limitation of his cardiac response to physical exertion, must be carefully weighed in estimating the importance of a valvular lesion.

#### DISORDERED ACTION OF THE HEART.

The old views as to cardiac irregularity have been entirely replaced owing to new methods of investigation and the precise information gained through them. The possibility or, as we now know, the fact that the signs of cardiac weakness and failure might follow as the result of the irregularity does not seem to have presented itself until recently. Thus Balfour states: "Associated with any other valvular lesion irregularity must always be regarded as a symptom of cardiac failure." It was noted that in cases of cardiac failure from any cause an irregularity of the pulse was often present. It was further noted that many cases of severe cardiac failure showed a markedly irregular pulse and heart beat. From these observations the conclusion was drawn that in all cases cardiac irregularity was to be regarded as an indication that the cardiac power was failing, whether the disease was a general one, for example, typhoid fever or pneumonia, or one primarily affecting the heart, for example valvular disease. The irregularity was supposed to involve the whole cardiac action; there was no knowledge as to any precise localisation of the irregularity in the heart or as to the underlying changes in the myocardium.

The explanation of the uncertainty was not far to seek. To physicians symptoms are the clues of hidden disease, and the successful working up of clues is a powerful aid in diagnosis. On the other hand, a symptom which is not understood is a clue which leads nowhere, or possibly leads into error. Explanations were attempted as to the cause of the irregularity. Broadbent found that irregularity was the distinguishing feature of the pulse of mitral regurgitation. His explanation of the irregularity was the varying pressure to which the heart is subjected in inspiration and expiration, and the varying supply of blood to the ventricle thus induced in the presence of mitral regurgitation. It is interesting to compare these views with those of Balfour. The latter says:—

Like all other cardiac cases, those with mitral stenosis come to us as patients when compensation fails; an early result if not also a cause of this is defective nutrition of the myocardium, and as a consequence irregularity of the heart's action and of the pulse, more marked in this form of cardiac affection than in any other, and often amounting to a veritable delirium cordis.

We have now reached the stage at which the great majority of cardiac irregularities have been analysed and classified. The special types can be demonstrated by means of the polygraph and the electro-cardiograph. Irregularities which have no significance or importance can be separated from those which have both significance and importance. These are great advances from the student's point of view. What seems to be the chief discovery is that certain irregularities are directly responsible for an increased rate of the heart and an inefficient heart beat, from which signs of cardiac failure follow sooner or later. The heart is usually affected with disease previously and the irregularity follows, but the irregularity is the cause of such a disturbance in the cardiac functions that the previous lesions may be entirely obscured and fresh symptoms develop. Some irregularities, on the other hand, are of no significance or importance as regards the cardiac functions. If we wish to form an

estimate as to the importance of a cardiac irregularity we can employ as a standard the effect it has on the driving power of the left ventricle. We can observe, when an irregularity develops, the appearance of fresh cardiac symptoms, of changes in the heart itself, and it may be of progressive heart failure under the continuance of the irregularity. On the other hand, we can observe the return of the heart to its previous condition and the disappearance of the added symptoms when the irregularity ceases. In the field of therapeutics we have also to deal with irregularities, and a wide sphere of usefulness is now open for the employment of remedies in checking the injurious effects of irregularity on the action of the left ventricle.

In the past, clinical records of cases in the hospital wards or in publications frequently contained the words "the heart was irregular" or "the pulse was weak and irregular." The fact was noted, and if any inference was drawn it was to the effect that the irregularity was a bad sign. Now we expect an observer to state what form of irregularity is present, and to designate its probable site of origin, and to form an opinion as to the significance to be attached to it. For this purpose I should like to urge strongly that all students should be taught how to use the polygraph and the electro-cardiograph in the analysis of cardiac irregularities. They may not be able to possess them in their practice later on, but, speaking generally, they will be able to apply what they have already learned by using the ordinary bedside methods of examination. When once they have been able to take and study records from cardiac irregularities in cases under their own observation, they will have a much better mental realisation of the meaning and significance of these irregularities. In my student days we were taught the use of the sphygmograph, and many tracings were taken of different forms of irregularity. But the pictures were meaningless; we did not understand how the irregularity was produced or where it was produced, or what was its significance, if any. At the present time instrumental methods supply the key to these hidden mysteries, and a practical knowledge of these instruments will, I am convinced, be of lasting benefit to the medical student.

Disordered action of the heart may be of two kinds—namely, (1) disturbance of rhythm and (2) disturbance of rate. Either may be present alone or both may be present at the same time. Further, the rhythm of the heart may be disturbed without any interruption of the ventricular regularity, as is seen in cases of complete heart-block and auricular flutter, so that we may feel a regular pulse, listen to a regular ventricular beat, and yet be dealing with a case in which the rhythm of the heart is irregular and the irregularity is productive of definite signs of cardiac weakness. Again, the rate and regularity of the ventricular beats may be quite normal, and yet the auricular rate may be three or four times as great. This is seen in connexion with auricular flutter.

There are many forms of disordered action of the heart which were elucidated by means of graphic records. They seem complicated and have required a new nomenclature. Fortunately, they are often accompanied by distinctive clinical signs or symptoms, so that their recognition by ordinary bedside methods is steadily being rendered more easy.

There is a close interaction between disturbances of rate and of rhythm, so that the two might always be considered together in the clinical study of a heart case. An increase of rate or an irregular action is not necessarily an indication of a diseased heart; either may occur in a sound heart or in the functional disturbance of a sound heart. But in the case of heart disease of any type, presenting symptoms of cardiac failure, it may be said that some disturbance of rate or rhythm will very often be present. Further, it will usually be found that the symptoms of distress from which the patient is suffering are the result of this disturbance of rate or rhythm or, to be more precise, of the impairment of the functional activity of the left ventricle induced by the disturbance.

#### IRREGULARITY OF RHYTHM.

An irregularity of rhythm may be present without any injurious reaction on the heart, without, in short, any significance whatever. Of this class the commonest type is the sinus irregularity associated with respiration, in which the rhythmic discharge of impulses from the sino-auricular node is irregular. It is of no importance because it does not

affect the normal sequence of cardiac contractions in the different parts of the myocardium.

#### *Extra-systoles.*

Another form of irregularity may, under certain conditions, be considered as of no importance. An extra-systole is a very common irregularity in elderly people, who present no other indication of heart changes apart from those of old age. There is here a definite disturbance of the cardiac rhythm, occurring occasionally. The point of importance would seem to be that the extra-systole occurs so infrequently that the effect on the action of the left ventricle is negligible. Suppose it occurs every fifth beat when the heart-rate is 75. We shall then have 60 normal contractions per minute to 15 abnormal. The frequency of the abnormal contraction is not sufficient to disturb the efficiency of the ventricular action. Under these conditions therefore the presence of an irregularity may be of no significance, although under other conditions, that is great frequency of recurrence, the same irregularity may seriously disturb the cardiac action and power.

The extra-systole or premature contraction has been the subject of much study within recent years. It has been suggested by Lewis that such varied conditions as paroxysmal tachycardia, auricular flutter, and auricular fibrillation have as their pathological basis the same condition as that which gives rise to the solitary extra-systole. But the cause of an extra-systole is still to be found. It arises under such a multiplicity of conditions that one is led to wonder whether there is any pathological importance to be attached to the solitary extra-systole. It can be produced artificially in the laboratory; it is found in childhood and old age; it may be present in an otherwise healthy heart and in one which is diseased; it is associated with temporary nervous disturbance—for example, neurasthenia, with toxic conditions, and with the convalescent stage of many illnesses; it may occur only on exertion or only during rest, while the patient is standing up or only when he is lying down; and it may arise through the action of the vagus or through the action of digitalis. The list may be indefinitely prolonged. So far it has been determined that the extra-systole always arises at some abnormal spot in the heart—that is, not at the normal starting-place, the sino-auricular node. It is assumed by most writers that it is the result of an abnormal irritability, an increase of functional activity at some focus in the heart. This local overactivity leads to a premature impulse-discharge and contraction before the normal cardiac cycle starting at the sinus has begun. It may, however, be argued equally plausibly that there has been a depression of activity, a block in the conduction at some spot which, after a brief delay, initiates a contraction on its own. At present neither the one nor the other assumption can be proved or disproved.

#### *Auricular Fibrillation.*

There is no form of cardiac irregularity which is of more importance, both from its frequency and its gravity, than auricular fibrillation. It is interesting to note that when Balfour and Broadbent were discussing cases of extreme cardiac irregularity they were dealing with cases of auricular fibrillation. The serious symptoms associated with "failure of compensation" and "ruptured compensation" were clearly due to the same cause. The great benefit which followed the use of digitalis in heart disease was notably obtained in a certain type of case which we should now describe as auricular fibrillation. The facts are clearly shown in the clinical records of the past.

The clinical conditions which mark the onset of auricular fibrillation were noted, although not understood, by previous writers, and were found to arise most commonly in association with mitral stenosis. Certain stages in a case of mitral stenosis were accurately observed, and in the last stage peculiar features were commented on. For example, it was found that the second sound at the apex had disappeared. One explanation of this was that the enlarging right heart had so displaced the left ventricle backwards that the second sound became inaudible. Another fact noted was the disappearance of the presystolic murmur, and this was ascribed to the development of tricuspid regurgitation, and the diminished pressure in the pulmonary circulation and left auricle which followed. These facts as observed were correct, but the attempted explanations had rather an

academic interest because their bearing on the cardiac disturbances which accompanied them was not understood.

The recognition of the importance and frequency of the presystolic murmur, as described by Gairdner, was slow. The same may be said about auricular fibrillation. Yet auricular fibrillation is more than a name—it is a landmark in the advance of medicine. For the student the subject of cardiology will be rendered easier when he has watched and learned (1) the earlier stages of mitral stenosis, (2) the progress up to the onset of auricular fibrillation, (3) the clinical phenomena of auricular fibrillation; and (4) the results of its treatment by means of digitalis.

The history of the discovery of the condition now known as auricular fibrillation is worth repeating. A practitioner in Burnley—whom we now know as Sir James Mackenzie—had made out by means of his polygraph a method of recording the pulsation of the right auricle in what is known as a "jugular" or "venous" tracing. Under conditions of health and in many cases of disease this took a certain form showing definite waves or peaks. One of his old cases of mitral stenosis suddenly developed signs of heart failure, with extreme irregularity of the pulse. With this, as he had noted in other cases, the presystolic murmur disappeared. On taking a venous tracing he found that all trace of auricular contraction had also disappeared and that apparently the right auricle was not acting. Here, then, was the explanation of the disappearance of the presystolic murmur—the auricle was not contracting. The exact condition present was determined later, Cushing pointing out that the jugular and arterial tracings from dogs in experimentally produced auricular fibrillation resembled closely the peculiar jugular pulse and irregular rhythm in the human subject. Lewis proved later by means of the electro-cardiograph that the condition in the human subject was identical with the so-called auricular fibrillation in animals. I do not suppose that Mackenzie had at first any idea of the importance of his discovery, which has only been emphasised by subsequent work. In one thing he was singularly fortunate, for he had not only found the key to many previously unexplained cases of cardiac failure, but he had made it possible to employ digitalis with knowledge and with precision, a fact which he himself was the first to recognise and take advantage of.

For clinical purposes the two conditions of auricular flutter and auricular fibrillation may be considered together as being varieties of a disturbed action in the rhythm of the heart which have a common basis. In flutter definite although weak contractions, but of a different kind from the normal ones, are still taking place, while in fibrillation they are absent. In flutter the ventricular contractions may be regular or irregular for longer or shorter periods, usually they are regular; in fibrillation they are always irregular. In flutter the auricles may be contracting at the rate of from 150 to 300 per minute, possibly more; in fibrillation certain obscure muscular movements are detectable by the electro-cardiograph and are usually at the rate of from 300 to 600 or more per minute.

In connexion with chronic heart disease both conditions—fibrillation and flutter—tend to recur and finally to become permanent. In acute heart disease (rheumatic) an attack of either condition may be merely a temporary manifestation of active carditis. In acute and early heart disease flutter and fibrillation are rare, but some cases have been described, and even in quite young subjects. As a general rule flutter and fibrillation are associated with heart disease of some standing—for example, cases of mitral stenosis of considerable duration and of rheumatic origin or degenerative changes from cardiac sclerosis in elderly persons.

#### *Symptoms Associated with Auricular Flutter and Fibrillation.*

These two conditions, flutter and fibrillation, do not represent a form of heart disease, but a complication occurring in the course of heart disease. The normal rhythm of the heart has been disturbed, and the importance of the disturbance may be measured by the effect which the development of fibrillation or flutter has on the action of the left ventricle, and to a less extent of the right ventricle. The symptoms which follow are dependent on the response which the left ventricle is capable of making in the presence of this disturbing factor.

As a matter of clinical experience it will be found that in some cases the onset of auricular fibrillation will not be

characterised by any fresh symptoms which attract the patient's attention. In other cases, what the patient notices is the irregular action of the heart, without any added symptoms. In other cases the patient is conscious of increasing breathlessness on exertion or even at rest, and a marked limitation of his previous cardiac power. In other cases the disturbance of the cardiac action is sudden and profound, and the signs and symptoms are those of acute heart failure.

The nature of the symptoms which follow the onset of fibrillation or flutter will depend on several different factors. As already stated, the important point is, how does the left ventricle respond to meet the embarrassment caused by the new rhythm?

One factor of importance is the rate of the ventricular contractions which follows the onset of fibrillation. Unless some damage is present in the junctional tissue (A.-V. node and bundle) an increase in the rate of the ventricular contractions frequently follows, and the greater the increase the more marked will the symptoms of distress be. Thus with a ventricular rate of 150 per minute the symptoms will probably be more urgent than with one of 120. The importance of this increase may be assumed when we consider that a damaged heart, carrying on the circulation with more or less difficulty at a rate of 75 per minute, suddenly has its resting and recuperative period of diastole diminished by one-half, and its contractions doubled in number when the ventricular rate runs up to 150 per minute. The importance of this increase is demonstrated by the therapeutic results which follow from a slowing of the cardiac rate, as will be shown later.

A second factor which has to be considered is the irregular action of the ventricle. This irregularity is the result of the impulses proceeding from the auricles reaching the ventricles in an irregular manner owing to a disturbance of conductivity at the auriculo-ventricular node and bundle. The ventricle is filled irregularly, it is stimulated irregularly, and it contracts irregularly. There is thus a further loss of driving power and force, many of the ventricular contractions being so feeble that they cannot be recognised by feeling the radial pulse. While a regular rate of 150 beats per minute will tend in time to exhaust the ventricular force, a condition of exhaustion will be induced more rapidly when gross irregularity is superadded, as occurs in auricular fibrillation. It has seemed to me that the development of symptoms of acute heart failure is more common with fibrillation than with flutter, and this may be explained by the fact that although in the latter the ventricular rate may be as rapid, the element of irregularity is usually absent or much less marked.

A third factor is the state of the myocardium of the left ventricle at the onset of fibrillation. If the myocardium is healthy, or hypertrophied and powerful, the response will probably be good, and the symptoms not severe. If, on the other hand, the myocardium is much weakened by disease, the response will be less satisfactory. If the heart has been carrying on the circulation efficiently before the attack, although it has been diseased, then the disturbance which follows, although it may be severe at first, will probably yield readily to rest and treatment.

The clinical symptoms associated with the progress of auricular fibrillation were recognised 20 years ago. They were ascribed to cardiac failure, and it was noted that the pulse and heart were irregular. Now we ascribe the symptoms to the presence of an irregular rhythm of the heart—auricular fibrillation—and we can explain how the symptoms follow from this irregularity. Here is a description of the symptoms of auricular fibrillation by one of my predecessors which could not be bettered in the present day, although it was written for quite a different purpose.

When irregularity of the pulse is a marked feature, when a few beats are large and turbulent, to be followed by several small beats, when the pulse no longer corresponds in number with the cardiac contractions, when the heart itself shows signs of hypertrophy and extending dilatation of both ventricles with dullness extending upwards over the conus and left auricle, when the neck veins become full, fill from below and pulsate, the liver enlarges, the cellular tissue becomes dropsical, the lungs congested, and the urine scanty—with these symptoms and signs we have with increasing urgency the conditions calling for digitalis. (Sir Douglas Powell.)

#### *Acute Development of Auricular Fibrillation and Rapid Cardiac Failure.*

These chronic and progressive forms of auricular fibrillation are very common, and are recognised as such at the present time. I do not think that the acute development of auricular fibrillation and rapid cardiac failure is so generally recognised. One reason is that the cardiac conditions from the point of view of sounds and murmurs may be entirely obscured by the accompanying developments, as in the following cases.

A carman, aged 46 years, was admitted to hospital in a state of extreme respiratory distress. The history was that the same morning, about 8 o'clock, he had complained of a painful feeling of tightness in his chest. This was followed almost immediately by a difficulty in breathing, which gradually became worse until he was unable to move or exert himself in any way. The patient was breathing with extreme difficulty, unable to lie down, and the respirations were slow with prolonged wheezing expiration. The face and lips and hands were very cyanosed. The pulse was feeble and irregular, at the rate of 130 per minute. The heart sounds could not be heard owing to the loud rhonchi and rales which filled both lungs. The cardiac apex and the cardiac borders could not be determined. The liver was much enlarged. Various diagnoses were made as to the cause of his condition and to meet these the treatment was also varied. Venesection was performed to half a pint, and he received injections of morphine, atropine, strychnine, adrenalin, and ether, while brandy was given freely. I saw him six hours later, when his breathing was considerably easier. The pulse was of the grossly irregular type, beats of different strength being mixed up in a hopeless jumble. A pulse-tracing showed this well. A venous tracing could not be taken owing to the overaction of the neck muscles.

The history subsequently obtained was that he had had rheumatic fever 30 years previously, and had been discharged from the Navy 15 years previously because of heart disease. Since then he had been driving a two-horse van, a form of occupation sufficiently arduous. He had had no cardiac symptoms until three weeks previously, when, while lifting a heavy weight, he was seized with a severe pain across his chest and in the left arm, the power of which was lost. He recovered entirely in three days and resumed work, which he continued until seized with the present attack.

When the respiratory distress had quieted down it was possible to make out the cardiac condition. The rate had slowed down under treatment but the action was still irregular. The presence of auricular fibrillation was demonstrated by means of electro-cardiograph and polygraph tracings. The heart was much dilated and there were some powerful beats felt amongst many weak ones. The signs of mitral and aortic regurgitation were present. As is usual in such cases, rapid relief from all distressing symptoms soon followed after the heart was slowed, and the patient was able to be up and about.

There was little doubt that in this case the heart, although damaged by disease of many years' standing, had not shown any signs of actual failure until the sudden onset of auricular fibrillation. The symptoms of distress, taken along with the typical irregularity of the pulse, were sufficient to allow of a diagnosis being made. The condition of auricular fibrillation persisted during the following two years, after which the patient passed from observation. During this time the patient was always free from urgent cardiac symptoms when his heart-rate was controlled by digitalis.

A boy, aged 13, was a hospital patient owing to heart disease. He had had rheumatic fever at the age of 4½ years and on several occasions later on. He had been admitted to hospital several times because of shortness of breath and general weakness. The heart was greatly enlarged, on the left side especially, and the heaving action there suggested hypertrophy. The enlargement was ascribed to aortic regurgitation, a well-marked diastolic murmur being present at the base. The pulse was typically collapsing and the rate was from 100 to 110. After a short rest in the hospital he was usually able to take a moderate amount of exercise without discomfort.

On Nov. 14th, 1914, after running, he became very short of breath and complained of pain in the left side of the chest. He went home, and his mother noticed that he was very blue and cold. The breathing became worse and he was admitted to hospital. On admission he showed cyanosis, great dyspnoea, and anxiety. The dyspnoea was so great that a venous tracing could not be taken. A radial tracing showed a ventricular rate of 220 beats per minute, perfectly regular, and naturally a small pulse-wave. The cardiac condition determined was one of great dilatation, the apex

being in the seventh intercostal space 4 inches outside the nipple line. The right side of the heart was also considerably dilated. Over the whole praecordia a systolic murmur was audible. The liver was very much enlarged, the temperature was subnormal, and the respirations were 50 per minute. A short, hacking cough was very persistent and numerous rales and rhonchi were audible on auscultation. He was ordered digitalis.

Four days later he was somewhat easier but still suffering from dyspnoea and anxiety, but the cyanosis was less. The pulse-rate was 200, but for a short time during the day it had fallen to 100. The ventricular action was at times perfectly regular and at other times hopelessly irregular. Venous tracings suggested strongly a condition of auricular flutter when the heart's action was regular and of auricular fibrillation when it was irregular. He had taken ten doses of Nativelle's digitalin (gr. 1/240 sing.).

Ten days after admission the boy was free from all discomfort. The cardiac rate was 100 and the action was still irregular, the condition being one of auricular fibrillation. An aortic diastolic murmur was clearly audible and the pulse was collapsing. He had taken 18 doses of digitalin in seven days, when it was stopped because of vomiting. The signs of pulmonary and hepatic engorgement had passed off.

He remained a month in the hospital and was completely relieved of all acute symptoms. The auricular fibrillation persisted. A month later he was readmitted in a condition of acute cardiac failure very similar to the previous attack. The pulse was uncountable, but auscultation showed a cardiac rate of about 200, and very irregular action. On Jan. 12th the cardiac rate was 200. On the 13th, after three doses of digitalin, the rate was 120. On the 14th, after seven doses of digitalin, the rate was 84. On the 15th, after eleven doses of digitalin, the rate was 68. Vomiting occurred and the digitalin was stopped. With the slowing of the cardiac rate there came (1) the disappearance of all dyspnoea and anxiety; (2) the reappearance of the diastolic aortic murmur and the collapsing pulse; (3) no evident change in the size of the heart; (4) a clearing up of congestion in the lungs and liver. The auricular fibrillation did not pass off.

He was discharged on Feb. 2nd, quite able to take moderate exercise without discomfort. The advice given to continue his digitalis regularly was probably not followed. He was readmitted on July 12th in much the same condition as before, and died within a few hours. The autopsy records state: the heart is enormous; all the cavities are dilated; the ventricles are much hypertrophied; the pericardium is generally adherent; the mitral valve is much dilated; the aortic valve is incompetent.

Attacks of cardiac failure such as occurred in these two cases would have been described in the phraseology of former times as due to "broken compensation," and would now be described as due to "the onset of an abnormal rhythm," which in these cases was auricular flutter or fibrillation. The term "broken compensation" did not convey much information as to the cardiac changes, and so treatment was guided by the general signs and symptoms—an empirical treatment, even if often singularly successful. Now our treatment is directed to the cardiac changes, and more especially to the effect which these produce on the efficiency of the left ventricle, and the advantages of this will be considered later on.

I should like to go a little further and say that the term "failure of compensation" is actually wrong in such cases, because the compensatory changes have not broken down. Reference has already been made to the automatic action of the heart which maintains the circulation in the presence of valvular lesions, adherent pericardium, arterial disease, &c. The compensatory changes which have automatically taken place in the heart under these conditions do not break down at the onset of an abnormal rhythm like auricular fibrillation. They are there, and are still efficient if given suitable conditions for their action. This is shown by the fact that if the abnormal rhythm ceases or if its effects are removed by treatment the compensatory changes are found to be as efficient in carrying on the circulation as they were before.

**TAUNTON AND SOMERSET HOSPITAL.**—The annual meeting of the governors of this charity was recently held. The medical report was satisfactory. The financial statement showed that after appropriating legacies of £1310 there still remained an unfavourable balance of £2207. The committee regretted that Dr. A. E. Joscelyne had resigned from the honorary surgical staff. The Hon. H. E. Portman was re-elected president, and at the meeting he gave £1000 towards reducing the deficit balance of the hospital.

## ANTHRAX: SIMULATING CEREBRO-SPINAL FEVER.

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(Report to the Medical Research Committee.)

Cerebro-spinal fever, now prevalent in various parts of the country, is to most of us a disease of which we have had little previous experience, and one that is so protean in its manifestations that it is not surprising to find that mistakes in its diagnosis frequently occur. Confusion as to its recognition may happen in illnesses accompanied by toxæmia associated with acute infective processes, or in certain acute cerebral diseases of primary origin and in meningitis due to causes other than meningococcal infection.

While, on the one hand, cases of cerebro-spinal fever have been mistaken for influenza, typhoid fever, pneumonia, measles, rheumatic fever, acute poliomyelitis, epilepsy, tuberculous meningitis, acute appendicitis, and other maladies; on the other hand, such diseases themselves have been regarded at times as cerebro-spinal fever. The following notes refer to five cases which were primarily thought to be cerebro-spinal fever, but which proved ultimately to be acute anthrax. The series is published at the request of the Medical Research Committee and with the consent of the Director-General, Sir Alfred Keogh.

Three of the cases occurred among soldiers and two among civilians, the former coming to my notice in connexion with the returns made to me of cases of cerebro-spinal fever among troops; for particulars of the civilian cases I am indebted to Professor S. Delépine and Dr. John Ritchie.

The number of cases in which the diagnosis of anthrax has rested on the examination of the cerebro-spinal fluid is, I imagine, very small. Dr. Ritchie has directed my attention to the fact that Pollak<sup>1</sup> appears to have been the first to describe such a condition.

**CASE 1.**—The first case in the series was that of a Yeomanry Lance-Corporal, aged 29, reported upon by Captain J. H. Beilby, R.A.M.C.(T.), the bacteriological investigation being carried out by Professor Walker Hall in connexion with the inquiry in regard to cerebro-spinal fever undertaken by him for the Medical Research Committee. The patient was in Camp C from April 27th to June 19th, 1915, and was away on leave from June 5th-7th at a farm at B. While in camp he slept on a ground sheet on the grass floor of a tent. On June 17th he complained of malaise and shivering; the next morning he had a temperature of 100° F. and a red catarrhal-looking condition of pharynx and fauces. On the 19th he woke in a state of delirium at 6.30 A.M. and at 6.40 A.M. was semi-comatose, semi-delirious, with signs of cerebral irritation, photophobia, a tendency to curl himself up and to burrow his head backwards, these symptoms persisting during the day. At 7 A.M. a copious involuntary action of the bowels occurred, consisting of loose faecal matter. At 8.30 A.M. there was another loose evacuation, the faeces being mixed with a considerable quantity of blood. A provisional diagnosis of cerebro-spinal meningitis was made. At 1 P.M. lumbar puncture was performed. The cerebro-spinal fever fluid was clear and not under pressure. It contained neither cells nor exudate, and on arrival at the laboratory it was found to be unsuitable for examination. At 5 P.M. the temperature was 99.8° and the pulse 66, slightly irregular. There was photophobia, the pupils being equal and contracted. The head was not retracted, although retraction was present at 4.30 P.M. During the night the patient was restless and violently delirious. On June 20th he recovered consciousness, answered questions, passed urine at will, and recognised his father. He complained of headache and pain in the lower cervical region. During the day quiet delirium alternated with conscious periods. The bowels failed to act in spite of 1-grain doses of calomel every three hours and 2 grains at longer intervals. The pulse was slow and regular, the temperature remaining normal.

On June 21st the condition was similar, but the pain in the head and neck was still considerable. After an enema an action was obtained, the stool being free from blood and mucus. Late in the day the temperature rose to 101°. On the 22nd lumbar puncture yielded a small quantity of clear fluid, which was not under pressure and did not contain any exudate, cells, or organisms. No cultures were made. On the 23rd the temperature continued to rise,

<sup>1</sup> Pollak: Wien. klin. Wochenschrift, 1912, p. 1702.

reaching 103°. The general symptoms were the same, but the headache and cervical pain increased. At 6.15 P.M., when seen by Professor Walker Hall, the patient was semi-conscious, but when roused exhibited clear perception and appreciation of his surroundings. He showed slight retraction of the head and rigidity of the entire muscles of the back. The reflexes were a little exaggerated, and there was some increase in surface sensitiveness. Kernig's sign was doubtful, spots were not visible, the pupils were equal, and the ocular muscles acted well. Tache cérébrale could not be obtained; signs of cardiac or pulmonary lesions were absent. An opportunity to investigate the urine and stool did not occur. The following blood and other examinations were then made.

*Blood examination* (June 23rd).—The blood count showed 4,200,000 red corpuscles and 16,000 white cells. Hæmoglobin 60 per cent. The differential count yielded: polynuclears, 30 per cent.; eosinophiles, 2 per cent.; large mononuclears, 10 per cent.; small mononuclears, 8 per cent. The blood serum did not contain any agglutinins for paratyphoid A or B. Vaccination against typhoid had been carried out in January, 1915. *B. coli* were agglutinated 1 in 10, and 1 out of 7 strains of streptococci showed slight clumping in 1 : 25 dilution.

*Blood culture* (June 23rd).—Blood was transferred directly from the vein into various culture media. It was examined daily for seven days, but remained sterile.

*Lumbar puncture* (June 23rd).—Six cubic centimetres of yellow slightly blood-stained fluid were obtained in two sterile centrifuge tubes. It was not under pressure. Within three minutes a slight clot was formed. The contents of one of the tubes was used for film examinations. It did not show any exudate cells or any micro-organisms. The other 3 c.c. were used for cultural purposes. One portion was transferred to suitable media; the remainder of the fluid was injected into a mouse. Thirty hours later the mouse was dead and showed the classical appearance of anthrax infection, while the cultures of spinal fluid yielded a Gram-positive, spore-bearing non-motile rod, which grew anaerobically and aerobically, liquefied gelatine, and showed typically spiked outgrowth; on potato giving a growth at first white and later reddish brown; in broth growing without scum with a granular thready deposit and on plates and other media exhibiting definite colonies with outgrowing threads curving inwards again to the colony. A small dose of the culture from the spinal fluid was injected into a guinea-pig (250 grammes). The animal died in 20 hours. The characteristic oedema at the site of inoculation, serous haemorrhages, and enlarged spleen were all present. Cultures made from the area of infection, from the heart blood, and from the spleen all yielded pure cultures of anthrax bacilli. *Naso-pharyngeal swab* (June 23rd): A naso-pharyngeal swab showed Gram-positive cocci only. Films from naso-pharyngeal material did not disclose any phagocytosis of Gram-negative or Gram-positive organisms.

On June 24th the temperature fell a little and the cervical pain was somewhat less, but there was retention of urine. On June 25th the temperature fell further; at 3 A.M. the patient had an inclination to micturate, but was unable to do so. In the words of the orderly in attendance "he complained of feeling numb in feet, legs, and thighs, and could not lift his arms." At 7.30 A.M. the next day he coughed violently, then collapsed, and died at 7.45 A.M. A necropsy was not obtained.

*Remarks by Professor WALKER HALL.*—“Although vomiting was not present, the symptoms on June 19th were sufficiently suggestive to be considered by Captain Beilby and Lieutenant Wilkinson as indicating the presence of cerebro-spinal fever. There was no sign of cut, wound, or abrasion, or any local manifestations of anthrax. As it was not possible to arrange for a post-mortem examination, the original focus of entry of the bacillus could not be ascertained. The blood showed a definite polynuclear response to an acute infection, although it did not yield a growth of the organism at the time of culture. Apparently it had passed out of the blood for the time being and was localised in the cerebro-spinal canal. Because of the unusual occurrence, the whole of the technics adopted were rigidly subjected to the closest scrutiny and criticism; there seems to be no doubt, however, of the presence of the *Bacillus anthracis* in the deeply yellow-coloured cerebro-spinal fluid. Once this is accepted, the symptoms may be accounted for by the occurrence of pia-arachnoidal haemorrhages similar to those which have been described in connexion with fatal cases of anthrax infection. The origin of the infection was not defined. In the district which the patient visited from June 5th to 7th, cases of anthrax have not occurred. The man had not been on duty in the horse sick lines, and his own horse was well. The lack of examinations of blood, urine, &c., owing to the early death of the patient makes this record incomplete, but it

may serve as a purpose in directing attention to the possibility of similar cases.”

As this was the first of its kind to come under notice the case was submitted to close investigation. It is a matter for regret that no post-mortem examination was obtained, and that the materials sent to Professor Walker Hall up to June 21st were not suitable for examination other than microscopic. The sterility of the blood and the presence of anthrax in the cerebro-spinal fluid were conditions so unusual as to call for rigid examination of any possible or probable source of fallacy. The only recorded case of anthrax in the neighbourhood was that of the cow on a farm 12 miles from the camp where the man was stationed. This case was seen by the local veterinary inspector, and his diagnosis of anthrax was confirmed by the Board of Agriculture and Fisheries. No material from this cow or from elsewhere at this time was examined at the Bristol University Laboratory. It was not possible to establish any connecting circumstance between the soldier's attack and this cow.

The only anthrax at the laboratory was a culture kept among the stock cultures in a special room and not touched save for reinoculation on the first of each month.

The patient died a few hours before Professor Walker Hall established the diagnosis, and the death was returned as due to cerebro-spinal fever.

**CASE 2.**—Lance-Corporal R. P., aged 22, Royal Engineers, was stationed at Fenny Stratford, Bucks. He was on stable picket on May 19th, 1916, and on the 20th came to London and was billeted in a northern suburb. From the 22nd he was one of a class of about 30 men under instruction in signalling at the G.P.O., Aldersgate-street. On the 25th he felt cold and went to bed complaining of pain in the left side of his chest. He slept well, but remained in bed on the 26th, the pain in the left side having extended to the left shoulder, but on the whole he felt better. On the 27th at 4 A.M. he suffered from frontal headache and still complained of pain in the left side. At 5.15 A.M. he was seen by Dr. Bremner, a local practitioner, who gave him medicine, which, however, he vomited. The same day he was removed as a case of cerebro-spinal fever to the isolation ward at the City of London Military Hospital, where he arrived in a state of coma and died the same evening at 9 o'clock.

Lieutenant W. J. Tulloch, R.A.M.C., military bacteriologist of the London Command, was asked to examine the patient with a view to determining whether the case was or was not one of cerebro-spinal fever. The man died at the hour of Lieutenant Tulloch's arrival at the hospital. The following account of the patient's condition was furnished by Lieutenant Tulloch:—

*Examination of the body.*—The body was that of a well-nourished man. There was no evidence of external violence. No deformities or recent sores of any kind were noted beyond a slight abrasion over the left patella. On Saturday, between 12 noon and 12.45 P.M., he is known to have fallen. Petechial haemorrhages were present over the upper part of the thorax, both anteriorly and posteriorly, also over the external aspects of the upper limbs, notably around the elbows. A few petechiae were also found on the extensor aspects of the lower limbs, notably over the quadriceps extensor muscles. These petechiae were dark purple in colour and averaged from one-eighth to a quarter of an inch in diameter. Lumbar puncture was performed and about 10 c.c. of fluid containing blood was drawn off. This material was taken to the laboratory at Millbank at once and was examined. Organisms having the morphological characters and staining properties of the *B. anthracis* were present in large numbers and a provisional report of “septicemic anthrax” was given by telephone to the medical officer in charge of the case. Cultural examination confirmed this finding, and a post-mortem examination was arranged for Monday, May 29th, at 12 noon.

*Post-mortem examination.*—1. General appearances: Beyond what is noted in the previous paragraph nothing of import was found. Special attention was paid to the question of the presence of malignant pustule, but exhaustive examination failed to show such a sore. 2. Thoracic organs: On opening the thorax the pleurae were found to be filled with clear straw-coloured fluid, about 20 ounces on the left side and about 30 ounces on the right. This fluid was shown on microscopic and cultural examination to contain *B. anthracis*. The pericardium contained about 7 ounces of similar fluid. The anterior margin of the left lung was bound by recent adhesions to the chest wall. No haemorrhages could be found on the pleurae or pericardium. Heart: The heart was normal in size and no valvular lesions were present, but the cardiac muscle was very flabby and showed cloudy degeneration. Some heart blood was drawn

off with precautions to ensure sterility. Microscopical and cultural examinations showed *B. anthracis*. Lungs: The left lung was dense and haemorrhagic, and on section its condition was seen to resemble that of "splenization." No alveolar air could be expressed from the cut surface, while inter-lobe adhesions united the lobes of the organ. The right lung was markedly hyperemic, but from its cut surface air and serous exudate could be expressed. The serous exudate was shown on microscopical and cultural examination to contain *B. anthracis*. The trachea and bronchi: The mucosa of the trachea and bronchi was deeply injected and very small submucous haemorrhagic areas were present. At the bifurcation of the trachea and in the larger bronchi there was present blood-tinted secretion, which on microscopical and cultural examination was found to contain *B. anthracis* and pneumococci. 3. Abdominal organs: The peritoneum was injected but no hemorrhages were noted. The spleen was large, weighed 15 ounces, and was dark in colour and flabby. On section it was found to be diffused. The spleen pulp was examined and found to contain *B. anthracis* in large numbers. These were recovered on cultivation. The liver was normal in size and colour, but showed evidence of commencing cloudy degeneration. The kidneys were normal in size, the capsule stripped easily, and a few subcapsular petechiae were found. On section these organs showed nothing of pathological import beyond evidence of cloudy swelling. The other abdominal organs also showed evidence of cloudy degeneration. The stomach: This organ was empty, and large areas of the mucosa were intensely congested and showed extensive submucous hemorrhages, notably towards the pylorus. Intestine: The upper part of the intestine showed no evidence of pathological change. Careful examination was made to exclude the possibility of the case being one of gastro-intestinal mycosis. The bladder: This organ was full and it was decided as a point of scientific interest to examine the urine. It was found to be sterile. The cranial cavity: This was not opened, but a cervical puncture was performed. Again blood-stained fluid containing *B. anthracis* was obtained.

**Summary.**—(a) Evidence of general septicæmia; anthrax bacilli isolated from pleural exudate, bronchial exudate, spleen, heart blood, and cerebro-spinal fluid. (b) Widespread, haemorrhagic consolidation of the left lung with deep injection of tracheal and bronchial mucosa; some hyperemia of the right lung. (c) Great enlargement of spleen. (d) Deep injection of, and submucous hemorrhage in, the gastric mucosa. Absence of definite evidence of intestinal mycosis. (e) Cerebro-spinal fluid haemorrhagic and contained *B. anthracis*.

**Conclusions.**—1. The cause of death was septicæmic infection with *B. anthracis*. 2. There is no evidence that the route of infection was by way of the skin, or gastro-intestinal mucosa. There was, on the contrary, evidence that the infection was primarily bronchial.

**Report of histological examination of internal organs.**—1. Lung: This organ shows a haemorrhagic broncho-pneumonia. The alveoli in the affected parts are filled with blood. Over the pleural surface there is a haemorrhagic deposit. Sections stained to demonstrate organism reveal the presence of *B. anthracis* in large numbers within the alveoli and along the lymph capillaries, while neighbouring blood capillaries are seen to contain but few bacilli. 2. Gastric mucosa: The haemorrhagic condition of the mucosa is found to be submucous, and few organisms are found within the capillaries. The epithelium around the haemorrhagic patches is necrosed. 3. Heart: The cardiac muscle shows definite evidence of pigmentary degeneration and cloudy swelling. Few bacilli are seen within the capillaries. 4. Kidney: The epithelium of the tubules shows extreme cloudy degeneration amounting to complete necrosis in certain areas. The cells of the vessel walls and of the glomeruli do not exhibit this change to the same marked extent. Numbers of bacilli are seen both in the capillaries of the inter-tubular vessels and in the glomerular tufts. 5. Liver: This shows marked cloudy swelling. The organisms are easily demonstrated. 6. Spleen: Good preparations of this organ could not be made owing to its being diffused. These findings corroborate the observations made at post-mortem examination, and the distribution of the organism in the lung points to the case having been one of definitely primary bronchial infection.

None of the people in the house where the patient was billeted had anything to do with hair, hides, skins, horses, or cattle. He slept on a flock mattress with a feather-bed on the top of it. The floor was covered with linoleum and there were no hair or skin rugs in the room. Stable picket-duty would involve going into the stable, but it would not be necessary for the picket to handle the horses unless the animals were restive or ill. No horse sickness was reported at Fenny Stratford nor in the neighbourhood.

In this case *B. anthracis* was recovered from the cerebro-spinal fluid and from the heart's blood and spleen, as well as

from the pleural and bronchial exudates. It was clearly a general septicæmia. Beyond the abrasion over the left patella no recent sore of any kind was discovered; the shaven part of the face was carefully examined for traces of skin lesion. In the absence of any abrasion or lesion of the skin, and in view of the microscopical and histological post-mortem findings Lieutenant Tulloch came to the conclusion that the case was definitely one of primary bronchial infection. The patient's kit was removed from his billet and disinfected by the Islington sanitary authority. Examination of the articles showed that they had been sterilised and no satisfactory bacteriological examination could be made. The man's shaving-brush and razor could not be found; inquiry showed that these had been sent to the steriliser along with the other articles, but they were not returned.

As has been said, the source of infection in this case was not discovered.

**CASE 3.**—A Lieutenant-Colonel, aged 50, Canadian Army Medical Corps, who was in command of a military hospital near Aldershot, had not felt well for several days, the condition being regarded as ordinary catarrh or "influenza." During the morning of Jan. 3rd he seemed worse, but remained on duty until the afternoon. It was then noticed that the parotid region on the left side was swollen and a diagnosis of "mumps" was made. The swelling, however, increased very rapidly, so that by 5 P.M. the head was held over to the right. During the evening troublesome vomiting came on with acute abdominal and epigastric pain, and towards 11 P.M. the patient became drowsy. This drowsiness deepened to coma accompanied by convulsions, and with the idea that the case might be one of fulminating cerebro-spinal fever, a lumbar puncture was performed and blood-stained fluid obtained; the cerebro-spinal fluid was not under increased pressure. The patient died early in the morning of Jan. 4th.

Examination of smears of the spinal fluid revealed Gram-positive bacilli in chains and some Gram-positive cocci. This discovery raised the suspicion that the illness was due to anthrax. A post-mortem examination was made by Captain H. H. Scott, R.A.M.C., who found the following conditions.

**External.**—A small recently healed sore just in front of the anterior attachment of the pinna of the left ear; considerable swelling of the parotid region and of the neck adjacent to the left side, extending down as far as the clavicle. Incision into this swelling showed that the parotid gland itself was not affected, but the cellular tissue in and around it, the swelling being due to a dark bloody serum.

**Dissection.**—**Head:** The meninges congested with dark fluid. Thorax: Fluid in each pleural cavity; old adhesions at both bases. Small petechial spots over both pleurae, mainly on, but not confined to, the lateral aspects. The lungs showed nothing abnormal beyond the general dark serous staining. Heart and large vessels: Slight atheroma at the root of the aorta, no other abnormality, no valvular mischief; myocardium dark in colour; coronary vessels patent and a little rigid. Abdomen: The interior of the stomach showed several (10-12) ecchymoses, varying in size from that of a millet seed to a shilling, and about half of them surrounded a minute ulcer. The intestines at intervals, and especially the ileum, contained similar congested, ecchymotic patches, and occasionally ulcers the size of a pin's head, about six in all. Small extravasations were also present in the mesentery in four situations. Liver: Fatty and slightly enlarged. Spleen: Large and diffused. Pancreas: In this gland were a few minute whitish-yellow patches suggestive of fat necrosis, but not at all extensive and confined to the head. Kidneys: Right was enlarged, but showed no macroscopic abnormality. Left small and shrunken; this had been explored at an operation for perinephric abscess some years ago.

Cultures were made of the blood, of the cerebro-spinal fluid, and of the bile; and smears of the same fluids were also taken. The latter showed Gram-positive bacilli and chains of streptococci; the cultures all yielded a mixed growth of anthrax bacilli and streptococci. The anthrax bacilli were further confirmed by gelatine stabs, agar plates, and animal inoculation.

It would seem to be beyond dispute that the patient died from an acute attack of anthrax and streptococcal infection. Suspicion arose that he might have been infected by a shaving-brush. It was ascertained that the patient had purchased a new shaving-brush about three weeks before his illness. Cultures made from this brush were examined in the School of Army Sanitation at Aldershot and a guinea-pig was inoculated with the material. The *B. anthracis* was not shown to be present; the cultures contained mycoides. The guinea-pig died, but no trace of *B. anthracis* was discovered.

Two similar brushes, procured locally from the store at which the patient's shaving-brush had been purchased, were

examined by the military bacteriologists at Aldershot and at the Royal Army Medical College, Millbank, with the following results. At Aldershot the growth on agar was not typical of anthrax; broth became cloudy throughout; the gelatin stab was not characteristic, and produced gas; the bacilli were actively mobile, spores tended to be terminal, the bacilli had rounded ends, only grew in short chains, and were non-pathogenic to guinea-pigs in eight days. At the Royal Army Medical College a large number of cultures from the hair were attempted and three pure cultures of a spore-bearing bacillus which had some resemblance to *B. anthracis* were isolated and tested by intraperitoneal inoculations of guinea-pigs. The result of this part of the examination was negative. A considerable quantity of the remaining hair was thoroughly washed in sterile saline solution and the washings were injected into a guinea-pig. The guinea-pig died within 54 to 68 hours after inoculation with typical anthrax infection.

These examinations show that it is not an easy matter to determine the presence or absence of *B. anthracis* in the hair of shaving-brushes. Additional proof that infection was in all probability derived from the shaving-brush was obtained. The brushes in question were found to have been purchased at Aldershot from a middleman, who obtained them in December, 1914, from a London firm, to whom the brushes were being supplied from a factory to which other shaving-brushes infected by anthrax had been traced by Dr. F. J. H. Coutts, of the Local Government Board.

CASE 4.—Particulars of the bacteriological examination of this case are placed at the service of the Medical Research Committee by Professor Delépine.

J. O. L., aged 49, complained of feeling ill, shivered and had pain in the head on April 23rd, 1916; on the 25th the pain in his head was severe. At 11 A.M. on the 26th he sent for Dr. T. C. Somerville, of Waterfoot, who found that the patient had slight twitching movements from time to time. No definite diagnosis was made, but cerebro-spinal fever was suspected, and Dr. J. P. Brown, medical officer of health for Bacup urban district, was asked to see the patient in the evening, and this he did about two hours before the death, which took place the same night. Swabs from the naso-pharynx and cerebro-spinal fluid were taken post mortem on April 27th and submitted to Professor Delépine, of Manchester, for examination.

Professor Delépine found no micro-organisms resembling meningococci in the naso-pharyngeal swab. The specimen of cerebro-spinal fluid sent for examination consisted of about 5 c.c. of deeply blood-stained fluid, microscopical examination of which showed numerous red blood corpuscles, leucocytes, and large bacilli, but no meningococci. On culture growths having the characters of the anthrax bacillus were obtained on April 28th; and two guinea-pigs inoculated on April 27th died on April 28th with typical anthrax lesions from which pure cultures of anthrax bacilli were recovered. The patient worked at a felt manufactory and in his employment handled East India wool and cow hair. There was some exposure to dust from the wool but practically none from the hair, and the ventilation of the room was fairly good. The man was reported as being clean in his habits, but he used no overalls, gloves, or respirator, and he took his meals in the drying-room.

In this case the cerebro-spinal fluid, which was mixed with blood, was obtained post mortem and there is no evidence to show that the *B. anthracis* was present in the cerebro-spinal fluid before death. Professor Delépine, however, points out that *B. anthracis* is always found in the cerebral and meningeal vessels in cases of general anthrax. Although the man's occupation affords a clue as to the source of infection, the channel by which the disease was acquired was not ascertained. There were no external signs to indicate that the infection might have been acquired through the skin.

CASE 5.—The particulars of this case are placed at the disposal of the Medical Research Committee by Dr. John Ritchie, bacteriologist to the county of Dumfriesshire, and Dr. Mungo Bryson, of Thornhill.

C. E., aged 16, "glass-meat" worker, was seen by Dr. Bryson on the evening of Oct. 23rd, 1916. He complained of headache, chilliness, vague pains in back and legs, and of pain and swelling on the left side of the neck. He gave a history of having driven 28 miles in an open vehicle on the evening of Oct. 21st and of having been seized by chilliness and headache on his return home. His condition became worse during the following two days, and, when seen, he was evidently seriously ill, his temperature being 103° F., his pulse 108, regular, and full. The glands

on the left side of the neck were palpable, but not particularly tender. A small black scab was noticed beneath the angle of the left jaw. The patient, on being questioned, attached no importance to it, and did not know how it had been caused. The surrounding skin was perfectly healthy, showing neither inflammation, vesicles, nor any secretion. On the morning of Oct. 24th he felt rather better; temperature 101.6° F., pulse 108. The cervical glands were still painful, the throat showed no redness, and there was no skin eruption. During the night he was restless and complained of severe headache. When seen about 7.30 A.M. he was semi-conscious, but could be aroused by questioning. The pupils were equal, dilated, responded sluggishly to light, and there was slight nystagmus. Kernig's sign was present, but otherwise there was no spasm, tremor, or paralysis. Lumbar puncture was performed about 11 A.M. Approximately 10 c.c. of uniformly pink fluid, not under pressure, were drawn off. The fluid contained albumin and did not reduce Fehling's solution. About 5 ounces of urine were drawn off by catheter. It contained neither albumin nor sugar. During the course of the afternoon the patient had three convulsive fits and died about 3 P.M.

*Microscopic examination of cerebro-spinal fluid.*—Films made from the deposit showed great numbers of red blood corpuscles and a high leucocytosis, polymorphs and large mononuclear cells being present in a ratio of 3 to 2, roughly. The majority of those cells stained well, though a few large vacuolated cells in a degenerate condition were noted. In every field were large numbers of Gram-positive bacilli, morphologically identical with *B. anthracis*. These showed a great tendency to chain formation, chains of 15 to 20 rods being common. No other organism was detected. Cultures, aerobic and anaerobic, on blood agar and Löffler's serum showed after 18 hours a pure growth of typical anthrax colonies. Microscopically the organisms were identical with *B. anthracis*, and growth on ordinary media showed the usual anthrax characteristics save that "spiking" in gelatin stab was poorly developed.

A guinea-pig inoculated with a few drops of the washing from an 18-hours' blood-agar slope died within 30 hours. It showed the classical post-mortem appearances of experimental anthrax, and the bacilli were demonstrated in spleen, kidney, and pleural and peritoneal exudates.

A post-mortem examination of the body of C. E. was made on the evening of Oct. 26th. As it had to be rapidly performed at a late hour, and in a small country cottage, it was not practicable to make as extensive an investigation as might have been done in more favourable circumstances, but the following points were noted:—

Body well nourished. Post-mortem rigidity moderate. A small black eschar, about 0.5 cm. in diameter, beneath left jaw, showing appearances already noted. Otherwise no external evidence of disease. The left submaxillary gland seemed, on palpation, to be somewhat enlarged. Cranium: On reflecting the dura mater, which was of an intense purple colour, the pia and arachnoid were found to be exceedingly congested, all the vessels being distended and much extravasated blood filling the subarachnoid space. This hemorrhage covered the entire cerebral surface, and was most intense over the frontal and occipital bone. At no point, however, was the shape of the convolutions obscured by the extravasation, which was evidently of a less extreme degree than that occasionally found in similar cases (Bruce and Shennan,<sup>2</sup> Symmers and Wilson<sup>3</sup>). The cerebellum, pons, and medulla were comparatively little affected. The hemorrhagic condition appeared to be confined to the meninges, sections of the brain cortex showing nothing abnormal. Thorax: Beyond the fact that the lungs showed slight apical emphysema, and that there were some trifling pleuritic adhesions on the left side, there was nothing noteworthy in the thoracic cavity. Abdomen: The spleen was slightly enlarged, dark, and soft. The kidneys and liver showed cloudy swelling. The stomach was practically empty. It showed no sign of inflammation, nor could anything suggesting a primary focus of infection be detected in the bowel. There was no trace of peritonitis, and, except a few tubercular mesenteric glands, nothing else of note in the abdominal cavity. The left submaxillary gland showed, on section, a limited area of congestion. Cultures made from the spleen gave a mixed growth of *B. anthracis* and cocci. Cultures from the heart blood showed cocci. Sections of the brain and meninges, microscopically examined, showed extreme congestion of the meningeal vessels with much extravasation of blood. Enormous numbers of anthrax bacilli were present in the extravasation, lying chiefly around the vessels and in the subarachnoid space. Practically none were contained within the blood-vessels. There was no encephalitis. A considerable number

<sup>2</sup> Bruce and Shennan: Review of Neurology and Psychiatry, 1910 p. 521.

<sup>3</sup> Symmers and Wilson: Journal of Path. and Bact., 1909, xlii., 251.

of bacilli were found in the perivascular spaces of the cerebral substance, but here again the vessels themselves contained none. Sections of the eschar from beneath the jaw showed non-characteristic scar tissue. No anthrax bacilli could be detected. Sections of the submaxillary gland showed appearances suggestive rather of early tuberculosis than of any acute condition. No anthrax bacilli were seen.

Despite the negative results of the last-named examination, the presence of a skin lesion on the neck and the patient's complaint of pain in that neighbourhood seemed, in the absence of any other evidence as to the channel of entry of the infection, to require further investigation, although the possibility of a malignant pustule in this area aborting, healing spontaneously, and being followed later by an acute meningitis appeared somewhat remote. As the scar was within the shaving area the patient's shaving-brush was obtained for examination. The hairs were cut off, the handle broken up, the cement loosened, and the whole placed in sterile saline and slowly heated to 80° C. After cooling the liquid was strained through a loose plug of sterile glass-wool to remove solid débris, and then centrifuged. One or two loopfuls of the deposit were plated on agar, and the remainder suspended, and injected into the peritoneal cavity of a guinea-pig. The results were entirely negative.

In view of the fact that Elworthy<sup>4</sup> has shown that the examination of a shaving-brush suspected of having caused anthrax may give negative results, while other, unused, brushes of the same batch may show anthrax bacilli, we endeavoured to procure some other brushes from the dealer who had supplied C. E. This investigation led to nothing. C. E. had possessed his shaving-brush for a considerable time, and it was, in fact, doubtful whether he had procured it from the tradesman whose stock we investigated, or elsewhere. The only brush which resembled that used by C. E. was examined as described above, but again without result.

The fact that C. E. was employed in handling meat appeared to suggest the only other likely source of infection. The factory in which he worked deals with a large quantity of meat, much of it imported, and we could obtain no evidence of any meat of suspicious appearance having been used. No other cases of anthrax occurred among the workmen, and one would certainly have expected that, had anthrax-infected meat been accidentally used, some of the men who handled it uncooked would have been affected, rather than C. E. who worked with it only at a late stage of its preparation. Nevertheless, in the absence of any evidence of infection from other sources, the meat must rest under suspicion.

In regard to the absence of any demonstrable primary lesion the possibility of infection by the nose suggests itself. Risel<sup>5</sup> described a case of meningeal anthrax in which he claims to have demonstrated the passage of infection up the olfactory nerve, and points out that the direct communication which exists between the perineural lymphatics of the olfactory mucosa and the subarachnoid space gives opportunity to such a mode of spread. The infection in such a case would not necessarily be air-borne, it might be conveyed by the fingers.

The case described appears to indicate the desirability of performing lumbar puncture in all cases of meningitis of doubtful origin.—J. R.

The source of infection in this case was not traced. There is no evidence to show that the meat, handled by the patient in the course of his employment, and it was cooked meat, was infected by anthrax. Notwithstanding that careful examination of his shaving-brush failed to discover *B. anthracis*, yet as the patient had a small scar beneath the angle of the left jaw associated with pain and swelling of the left side of the neck, the possibility of infection having been acquired through the skin cannot be eliminated.

However the infection may have been acquired, the fact remains that the illness was regarded as suspicious of cerebro-spinal fever; and cerebro-spinal fluid, taken during life by lumbar puncture, was shown upon examination to contain *B. anthracis*, no other organism being detected.

## THE "LATENT PERIOD" IN ACUTE PERFORATIONS OF THE STOMACH OR DUODENUM.<sup>1</sup>

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ALTHOUGH a great deal has been written about acute perforation of the stomach and duodenum still the early diagnosis of the calamity is frequently missed. Not alone is an accurate diagnosis not made, but the fact that a grave intraperitoneal lesion has occurred is completely overlooked. This, I believe, is largely due to the fact that, contrary to what one would expect from reading the text-books on the subject, the symptoms in this condition are not progressive and the physical signs are not developed until comparatively late. In other words, two conditions arise—first, the perforation, and secondly, the development of peritonitis; between these two a varying interval may elapse which may well be called the "latent period." To illustrate this I cannot do better than give a short history, from many, of a couple of cases that recently occurred in my practice.

CASE 1.—A short time ago I was called to see a case, in consultation, about 50 miles from Dublin. I arrived there a couple of hours after receiving the message, on a Tuesday afternoon. The patient was a lady about 50 years of age who had enjoyed good health, unless for an occasional attack of dyspepsia, up to a couple of days previously. On the previous Sunday night she had a hearty supper at about 9 o'clock. She felt uncomfortable after this, but went to bed as usual and slept until about 4 A.M., when she awoke with violent pain in the abdomen, vomited, and felt intensely weak. Her doctor saw her at 9 o'clock on Monday morning. She then described herself as having some abdominal pain, or more discomfort than pain, but she was gradually improving and felt very much better than she had some hours previously. The patient and doctor were inclined to attribute the trouble to the supper taken the night previously, and the condition was not then regarded as very serious. All day on Monday her condition remained pretty much the same. On Monday night she got a grain of morphia hypodermically to produce sleep; this had the desired effect. On Tuesday morning, when the doctor again saw his patient, he got an unpleasant surprise. She looked badly, had a quick weak pulse, and her abdomen was markedly distended. He at once recognised that acute peritonitis was rapidly developing, and sent for me with a view of having operation carried out.

When I saw the patient early in the afternoon she was dying. All the symptoms and signs of diffuse peritonitis were then present. She lay on the back motionless, with the legs well drawn up; her breathing was altogether thoracic in character; her general aspect could not be worse. Her pulse was almost imperceptible and could not be counted, and her temperature was subnormal. She did not complain of pain and her mind was perfectly clear. Her abdomen was distended to almost bursting-point; she begged for something to be done for her. While I was discussing with her doctor the futility of operating the patient died.

Both of us were quite agreed that the cause of the fatality was gastric or duodenal perforation, probably the latter on account of the comparative absence of symptoms previous to the attack. The early diagnosis of the condition was entirely missed by as able a practitioner as there is in the provinces. He was completely misled by the condition of the patient when he first saw her, by her persistent statement that she was rapidly improving, by the complete absence of well-marked physical signs, and by the fact that she remained thus during the whole of his first 12 hours' attendance.

The second case occurred within a week afterwards, but fortunately had a very different ending.

CASE 2.—Miss \_\_\_, aged 22 years, was admitted to St. Vincent's Hospital on a Sunday afternoon about 5 o'clock. She was examined by the house surgeon, Dr. A. Courtney, who promptly diagnosed gastric perforation and sent for me, while at the same time he made preparations to have an operation carried out. Being Sunday I had some distance to get back to Dublin after receiving the message, but I saw her at 8 P.M. and got the following history. The patient had suffered from repeated stomach

<sup>4</sup> Elworthy: THE LANCET, 1916, i., 20.

<sup>5</sup> Risel: Zeit. f. Hyg. und Infektionskrankheiten, 1903, xiii., 381.

<sup>1</sup> A paper read at the Surgical Section of the Royal Academy of Medicine in Ireland.

trouble for some years and had received a good deal of medical treatment for the condition. She retired to bed on Saturday night in her usual health, but awoke on Sunday morning about 5 o'clock with violent abdominal pain. She vomited once and then almost fainted. After a couple of hours her symptoms practically passed off and she did not send for a doctor until 4 o'clock in the afternoon. She drank fluids pretty freely during the day. The doctor sent her unlabelled to St. Vincent's Hospital. On examination, about 16 hours after the attack beginning, her appearance was by no means bad; she did not complain of much pain, but felt decidedly uncomfortable. Superficially one would not think that she suffered from any grave abdominal lesion. She lay rather naturally with her legs fully extended; her breathing was by no means distressed and was not wholly thoracic; her pulse-rate was, however, suggestive, being from 110 to 120; her temperature was normal. Her abdomen was somewhat distended, and although tenderness was present, it was by no means well marked, and was principally above the umbilicus. There was almost a complete absence of rigidity of the abdominal muscles. Although one might miss the diagnosis, I had no hesitation in confirming Dr. Courtney's opinion.

*Operation.*—On opening the abdomen by incision to the right of the mid-line I found a large quantity of a greyish-green fluid everywhere present in the peritoneal cavity. I did not notice any free gas present. The visceral peritoneum was everywhere injected, I saw no pus and no sign of lymph formation anywhere; the intestines were generally distended but not to a great extent. After some time I located a perforation, into which I could put the tip of the index finger, at the extreme cardiac end of the stomach. To reach the perforation I had to prolong the incision right up to the ensiform cartilage. To close the perforation in this situation was by no means easy. By getting Dr. Courtney, who was assisting, to pull the liver upwards with one hand, while with the other he drew the stomach downwards, I was enabled to bring the site of the perforation better into view. I attempted to pass through-and-through sutures for closure, but they at once cut their way out. This was due to the large area of ulcerated and inflamed tissue surrounding the perforation. Consequently I had to close the perforation by sero-muscular sutures. These were interrupted in character and extended from well above the perforation to well below it. They were outside the ulcerated area, and by their insertion the ulcer was completely inverted and large surfaces of peritoneum were brought into apposition. I inserted only one row of these and no other means of closure was adopted. The cardiac end of the stomach was considerably narrowed in lumen when the sutures were tied, but no ill-effects seemed to follow. I removed the contents of the stomach that had escaped into the peritoneal cavity by gently swabbing with dry sponges. I used no douche, as is my invariable practice in all cases of peritoneal infection. Closure of the wound and providing for free drainage completed the operation. I placed a drainage-tube with gauze wick (1) between the liver and the diaphragm; (2) above the pubes; (3) one in each flank. These latter three I inserted by stab incisions, easily made when the abdominal wall is made to project from the inside on the finger or a forceps. During the operation and subsequently before she regained consciousness the patient received about 8 pints of normal saline solution administered under the breasts. The recovery was rapid and uneventful. No pus formation occurred after the operation.

The absence of pus or of purulent peritonitis either at the operation or subsequently is probably due to two or three causes. 1. The stomach was empty of food when the perforation occurred, consequently its contents were not highly septic. 2. The fact that the perforation occurred high up. I think we may take it as pretty certain that the more we descend in the gastro-intestinal canal the more septic the contents become. 3. The free drainage provided for at the operation. I am indebted to Dr. Courtney in this case for his prompt diagnosis, his able assistance at operation, and his after-care of the patient. I would emphasise the fact that when I saw her first, 16 hours after the perforation occurring, the symptoms were not severe and the signs of diffuse peritonitis were not at all very pronounced.

In both of these cases perforation occurred when the patient was asleep and when the stomach must have been free from food. This would point to the conclusion that auto-digestion plays a great part in the occurrence. To look at these cases of perforation from a proper standpoint we must remember that an interval varying in length elapses between the two acts of the tragedy—first the perforation, then peritonitis; and that for treatment to be successful our interference must take place before the second act is staged, or, at all events, before it is long in existence. Consequently early diagnosis is essential.

To simplify early diagnosis I consider it convenient to divide the course of events as regards symptoms and signs into three stages: (1) The stage of shock and collapse, (2) the stage of reaction, (3) the stage of diffuse peritonitis. One need only remember the sequence of events to see why each of these set of symptoms is brought about. The shock as well as the pain is altogether due to the injury which the peritoneum receives from contact with the stomach or intestinal contents. When the stomach is emptied, as it pretty quickly will be, by extravasation of its contents and by vomiting, the injury to the peritoneum ceases, until septic conditions develop. Unless the patient has received a knock-out blow reaction sets in, and the patient may be comparatively well sometimes for several hours. The length of time will depend on the degree of septicity of the contents escaped into the peritoneal cavity and on the amount. The development of peritonitis requires no explanation.

It is frequently during this time of reaction or latent period that the medical attendant first sees the patient after the attack has begun. Consequently his difficulty of diagnosis. He finds little on examination; the patient may look well, and usually asserts that improvement in his or her condition is decided. Symptoms are more or less in abeyance and physical signs are not yet well marked, and if the practitioner's knowledge of acute perforations has been derived from books and not from experience there is risk that the diagnosis will be missed. How, then, is the diagnosis to be made? The history of the case previous to the attack is of some value; the history of the attack itself is absolutely essential.

An acute attack of violent abdominal pain associated with severe shock and collapse, and followed by an improvement in the mind of the patient, is always significant. Add to this an increasing pulse-rate with a subnormal temperature and there is quite sufficient to warrant operative interference. Vomiting is not of much significance, as it may be absent in perforations, and it is present in so many other conditions.

Of course there will be physical signs elicited on a careful abdominal examination, but not so pronounced, as is usually believed, previous to the development of peritonitis. Great stress is laid on the rigidity of the abdominal wall. True, there will be rigidity present, but at this stage of the trouble it will be strictly confined to the area of the abdomen involved, and I have never seen it so marked that it could be described, as it often is described, as being "board-like" in character. Tenderness will also be confined to the region of the perforation, and no decomposition will have occurred either in the peritoneal cavity or in the abdomen to produce marked distension. So that during the "latent period" the diagnosis will have to be made (1) from the history of the attack; (2) an increasing pulse-rate without corresponding increase in temperature; (3) localised rigidity of the abdominal muscles; (4) localised abdominal tenderness; (5) beginning abdominal distension.

Fortunately, when the diagnosis is made there is no difference of opinion as to the essentials of treatment. These are altogether operative, with two main objects in view: to repair the lesion and to get rid of the foreign material from the peritoneal cavity. I always get rid of this material by dry sponging, gently used. I never douche, as I believe it does more harm than good, especially by bringing the infective material to the most remote corners of the abdominal cavity. Besides it takes time. I usually employ drainage, always when the soiling of peritoneum has been present for a few hours.

There is one other point about which a legitimate difference of opinion exists in the minds of surgeons. Should gastro-enterostomy be performed at the same time if there is indication that this procedure will be required later? Personally I am decidedly of opinion no, if it can be at all postponed. The further time required may turn the scale completely against the patient; besides, we are working in an infected area, and this is not conducive to good results. But in the last few weeks I had a patient from Mr. T. M. McEvoy, of Blackrock, with stomach perforation, in which I had to perform gastro-gastrostomy, and with the happiest results.

This patient had a perforation in the centre of a large ulcer on the anterior wall of the stomach about the junction of the upper and middle thirds. When I had the ulcer inverted the stomach was divided into chambers with only

*Continued at foot of next page.*

## MECHANICAL SUPPORTS IN PLASTIC SURGERY.

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CAPTAIN, R.A.M.C.; CAMBRIDGE HOSPITAL, ALDERSHOT;

AND

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CAPTAIN, ATTACHED R.A.M.C., CAMBRIDGE HOSPITAL, ALDERSHOT.

THE problem of the restoration of the contour of the face resolves itself into the provision not only of the fleshy covering, but also of the supporting substructure. It is the supporting framework with which we wish to deal in this paper, and we think its importance so great that too much consideration cannot be given to this subject by the plastic surgeon. In no other part of the work does the co-operation of the dentist and surgeon come more fully into play. Failure to provide a suitable substructure is, in our opinion, the commonest cause of plastic failures.

We hope very much by the illustration of certain types of case to prove the value of combined work. Exigencies of space prevent more than two cases being illustrated out of each group.

Firstly, we would discuss cases in which apparatus has been fixed in the mouth before operation, and we have divided these cases into three classes: Class 1, where the loss of substructure is slight and only requires a modified splint denture. Class 2, cases in which large prostheses were required to replace extensive loss of bone in the superior maxilla. Class 3, cases in which large prostheses were required to replace extensive loss of bone in the mandible.

Secondly, two cases are here illustrated to represent the class in which failures have occurred owing to the absence of correct substructure.

Before going on to the illustration of our point by these chosen cases we wish to make a few general remarks on post-operative treatment, when the support is implanted in the mouth at the time of operation. These remarks will be confined to the maintenance of cleanliness and to the importance of keeping the prosthesis continuously in its position. We are very strongly of opinion that every effort should be made before operation to fix in the requisite appliance; that in any cases in which this is impossible owing to cicatricial bands, as much of the apparatus as possible should be prepared beforehand, and the rest fitted during the somewhat lengthy operation; that when fitted, and the fleshy covering has been brought into place, no attempt should be made to remove the prosthesis until the tenth day, by which time the flap should be firmly united. Cleanliness is maintained by the usual oral hygiene, and in lower-jaw cases, in order to avoid any cul-de-sac, external drainage is usually provided. We also practise very slight loosening of the apparatus in order that syringing may be more efficiently carried out. As before stated, however, no effort is made to remove the appliances from the mouth, and we have come to this conclusion for the following reasons. It is frequently impossible to remove a large prosthesis; the removal causes pain to the patient, the apparatus seldom

replaces itself into exactly the same bed, and it is never so comfortable after replacement. Moreover, the continual taking out and putting in of the mechanical support very considerably disturbs the commencing union of the flaps, allowing septic material from the mouth to invade the tissues. We are thus following the cardinal principle of keeping the parts at rest, and we think we have shown that the cleanliness of the mouth is not hereby jeopardised.

Of the cases in which successful prosthesis has been applied at the time of operation,

*Class 1.*—Cases in which modified splint dentures. The greatest care is taken by Captain King and his staff to see that the apparatus is made to fit as firmly as possible, and that no roughness will be exposed to the tissues. Artificial teeth are usually added, which give not only confidence to the patient, but also guidance to the surgeon. Two cases (Figs. 1-5 and Figs. 6 and 7) illustrate this class, but do not require any special description of dental apparatus.

*Class 2.*—Cases in which large prostheses are required to replace large loss of bone in the superior maxilla.

*Private G.* (Figs. 8-10).—This case is characterised by large loss of the superior maxilla, together with almost complete loss of the upper lip. There remained only a small tag of mucous membrane near the left angle of the mouth. The prosthesis was made to represent the lost bone, and the skin and mucous flaps formed over it. Result of first operation shown.

*Private A.* (Figs. 11-14).—This case showed not only extensive loss in the upper jaw but also fracture of the lower. The edentulous condition made the work of the dental surgeon particularly difficult, and the favourable result of the first operation, as shown in Fig. 12, was only made possible by the three months' dental work, which consisted of (1) a palate plate which replaced the tissues of the palate; (2) a splint retaining the three fractured parts of the mandible in correct position; and (3) a vulcanite flange to support the lips and cheeks during and after operation.

*Class 3.*—Lower-jaw cases with large loss of bone requiring large prostheses.

*Private G.* (Figs. 15-17).—This man was edentulous, and had suffered a large loss of bone as well as lip. A lower denture was fitted, replacing the lost parts, and the plastic operation performed over it. The figures illustrate the condition on arrival and after one operation.

*Private O.* (Figs. 18 and 19).—This case shows the result of a plastic operation rendered simple by the preliminary dental treatment, which consisted in the fitting of upper and lower vulcanite splints, and the support externally of the chin by a vulcanite splint supported to the head with elastic. The patient was edentulous.

The other side of our argument is well illustrated by the unfavourable results obtained in the following cases, where, for various reasons, some unavoidable, no suitable apparatus was continually kept in position after the operation.

*Sergeant E.* (Figs. 20-23).—Operation performed for the formation of the new upper lip. The prosthesis made was not retained in position, and the inferior result is shown in the figures, necessitating the division of buccal adhesions and the stretching of the lip. A subsequent plastic operation has been done.

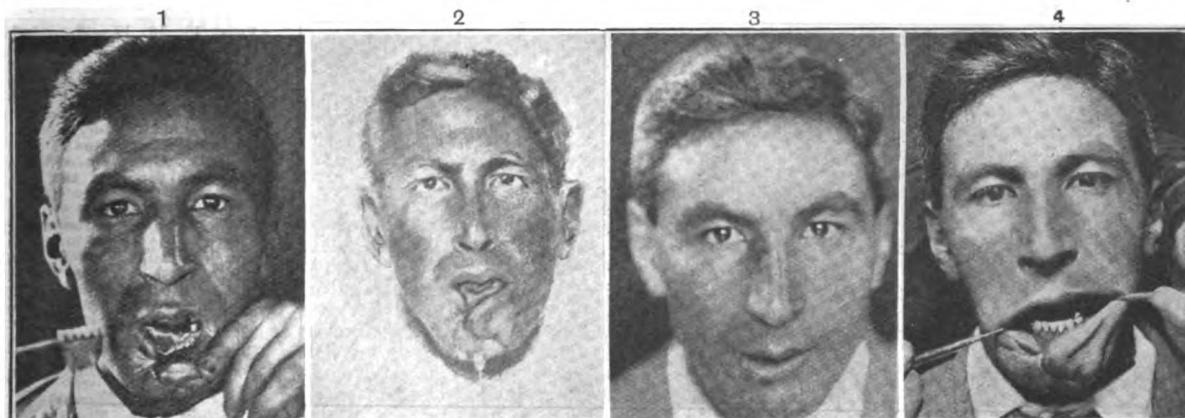
*Sergeant H.* (Figs. 24-27).—This case was characterised by very large loss of mandible, in the region of the angle, combined with buccal fistula. The dental treatment consisted in maintaining occlusion of the remaining teeth by a fixed biting flange enabling him to masticate. This flange (Figs. 25 and 27) was constructed by Captain F. E. Sprawson, R.A.M.C. An operation for the closing of the buccal fistula resulted in primary union, but owing to the very large loss of mandible, there is an unsightly depression which would not have occurred if it had been possible to insert any apparatus to take the place of the large bone loss. The loss of function in this case is so slight owing to the excellent articulation of the remaining teeth that a contemplated bone graft has been abandoned. Patient can eat his ordinary home diet.

*Continued from preceding page.*

a small opening between. I exposed the posterior wall in the usual manner through a rent in the transverse mesocolon. I did an anastomosis by suture between the upper and lower pouches. The patient made a complete and rapid recovery and was apparently free from all stomach trouble when leaving the hospital three weeks after operation.

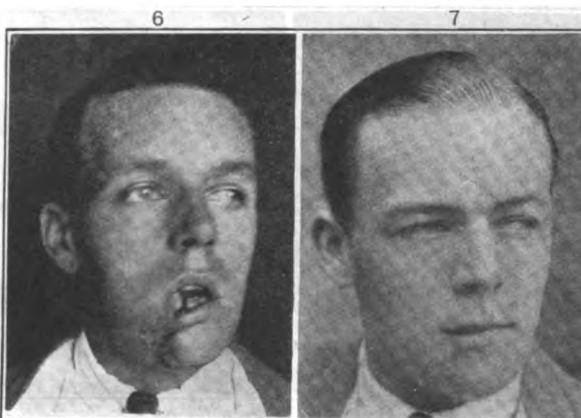
I owe an apology for bringing up for discussion a subject about which so much has been written, but I hope to have done something to direct attention to the early and accurate diagnosis of a condition which, when not detected promptly, is nearly invariably fatal.

Dublin.



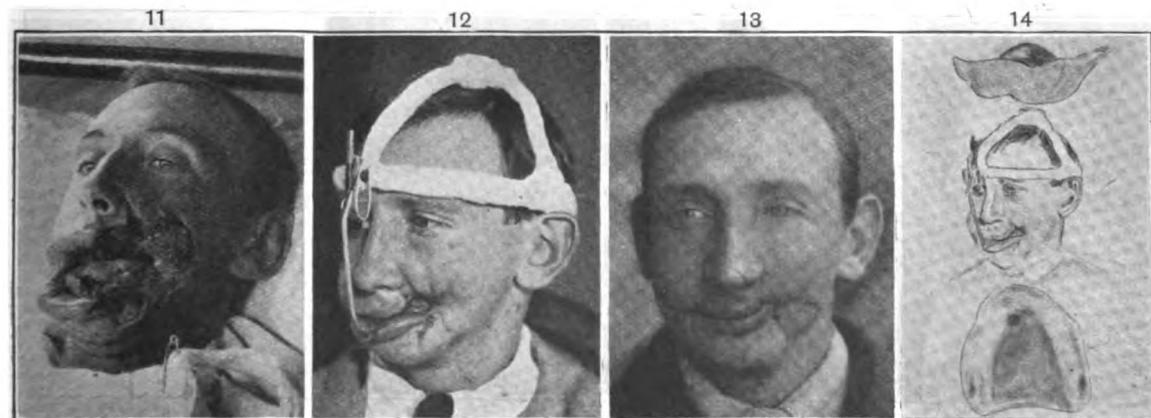
FIGS. 1 to 5.—Wounded 1/7/16. The deformity is well illustrated in Fig. 2, from a drawing by Prof. Tonks, F.R.C.S. Plastic operation 17/8/16. The radiating scars were all excised and by utilising the healthy skin in between scars it was not necessary to make any special flaps. The result is shown in Fig. 3.

FIGS. 6 and 7.—Wounded 1/7/16; operation, 16/8/16. Loss of bone through *whole* thickness of mandible. Operation: Performed over a modified splint denture, which retained the jaw in position. A successful osteoperiosteal bone graft from the tibia has since been performed.



FIGS. 8, 9, 10.—Wounded 14/8/16; operation, 5/10/16. The main principles in this operation were thick lateral-nasal flaps from the cheek combined with mucous membrane flaps from inside. The result of the first operation is shown. Further improvement in the mouth and nose have since been made.

FIGS. 11 to 14.—Wounded 1/7/16. Characterised by partial loss of superior and inferior maxilla, cheek, upper lip and corner of mouth. Result of the first operation on 4/10/16 is shown in Fig. 13; his condition immediately preceding is shown in Fig. 12. Fig. 13 result was obtained by cutting two flaps, one from the cheek and one from below the chin. Subsequent operation has markedly improved the left corner of the mouth.





## PLASTIC REPAIR IN WAR INJURIES TO THE JAW AND FACE.

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THE cases naturally group themselves into two classes, according to the nature of the deformity produced. In the one class the deformity is due to laceration with little or no loss of soft tissues; in the other, and more important, category definite destruction of soft parts gives rise to deformity which varies directly with the loss sustained. In both classes there may be an associated injury to or loss of bone, a complicating factor which has an important bearing on the mode of treatment to be adopted.

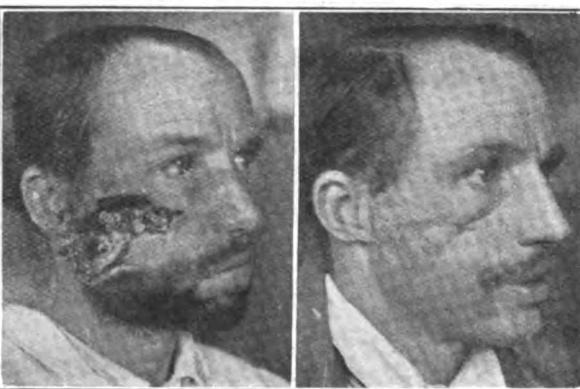
In all cases functional must take precedence of cosmetic considerations. Bony lesions must first be dealt with in such a way as to make possible the restoration of normal function. It may be laid down as an axiom that the repair of damaged or destroyed soft parts should never be undertaken until fractured fragments have been efficiently splinted. It may be thought unnecessary to lay stress upon such an apparently self-evident essential. Many cases, however, have come under my care in which such repair has been carried out, and that before a permanent splint had been adapted. In these cases it has been necessary to undo all that has been done to enable an efficient appliance to be inserted. Broadly speaking, early suture in cases associated with bony lesions is not to be recommended. In uncomplicated laceration, with little or no loss of tissue and not involving the mucous membrane of the cheek, early suture has a definite claim to consideration. Time will be saved and the formation of scar tissue to a large extent obviated. Where extensive laceration is associated with definite loss of tissue it is obvious that a depressed scar will result unless the lost tissue can be replaced. The best means of dealing with such a condition is the insertion of an autoplastic graft, a measure that will not be attended with success until every source of sepsis has been eliminated—that is, until

the wound is soundly healed. The illustrations show the condition of such a wound on admission (Fig. 1) and after operation (Fig. 2). The most ugly scars can thus be treated with the certainty that a satisfactory cosmetic result will be achieved.

It is, however, in the repair of lesions associated with loss of substance involving the mucous membrane either of the lips, cheek, or nose that the surgeon is afforded the greatest scope for the exercise of judgment and ingenuity. The one object always to be borne in mind is that any procedure must be so planned as to assure that the functional activity of the jaws shall be in no wise diminished. The paramount importance of this consideration and the greater ease and certainty of its attainment when the operation is undertaken at a later stage is the chief argument for adopting a waiting policy. Ingenious apparatus for the stretching of scar tissue has been devised, figured, and described by dental surgeons both in this country and abroad. The only objection to their use is that in a properly conducted case they are totally unnecessary; it is obviously a sounder policy to prevent cicatricial contraction, or to plan operations in such a way that due allowance is made for such contraction

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as must take place, than complacently to allow crippling contractions to occur and endeavour to redeem the situation by laborious methods designed to stretch and expand them. It is in this policy of prevention that my colleague, Mr. C. H. Bubb, has rendered me such invaluable service. The preservation of the buccal sulcus should be the constant aim of surgeon and dental surgeon alike, and both can contribute to its attainment. The importance of this cannot be too strongly emphasised. Failure in this respect renders the adaptation of a denture or prosthetic appliance very difficult, and frequently impossible, with the result that the implicated side of the jaw is rendered totally functionless. The cosmetic result in such a case may be entirely satisfactory; a fair exterior may decorously mask a functional failure.

In some cases associated with extensive bony lesions the loss of soft parts is more apparent than real. The skin edges curl over and invert to a degree sufficient to permit firm adhesion to the margins of the bony gap. This applies particularly to injuries of the upper jaw and the overlying tissues. Much can be done in such a case by freely stripping the tissues from the bone, followed by careful and separate readjustment of mucous membrane and skin surface. Figs. 3 and 4 illustrate the appearance of a case of this type before operation. The patient had been wounded three months previously. A suitable splint was inserted and retained until the parts were soundly healed. Fig. 5 shows the appearance after the sixth operation; the splint is in position. The associated bony lesions were destruction

of the greater part of the left maxilla, including the corresponding portion of hard palate, together with entire loss of the left ascending ramus, which was removed as a sequestrum. On admission to my wards at the King George Hospital cicatricial contraction had taken place to such an extent that the patient was unable to open his mouth more than one-sixteenth of an inch. A prosthetic appliance has been constructed and inserted by Mr. Bubb to such good purpose that the patient's functional capacity has been completely restored. In Fig. 6 is shown the final result. The nose is artificial; it was made and modelled by Mr. Brooks.

In most severe cases the tissues have suffered such a degree of destruction that mere readjustment will not suffice to ensure a satisfactory result. Some form of flap must be utilised to make good the loss sustained. The various types of flap may be classified as follows:—

I. *Single flaps*.—1. Sliding. 2. Transposed, the type commonly used to remedy ectropion. These two forms can only be used when the tissues in the immediate neighbourhood of the gap are sufficiently lax to admit of direct borrowing. 3. Transferred, depending temporarily for blood supply on a pedicle situated at a distance. 4. Hinged. A flap rotated on a hinged pedicle formed at the margin of the gap.

II. *Doubly epithelialised flaps*.—1. Formed in the gap coincident with its closure by the interposition of a single flap with the immediate or later imposition thereon of a second single flap. 2. Formed at a distance, formation antedating closure, (a) with one primary pedicle, (b) with two primary pedicles.

The use of single flaps is practically confined to reparative work on the lips. For this purpose the sliding and transposed flaps only can be utilised. The mucous membrane on the deep surface is included in the flap.

Plastic repair of lower lip and chin is illustrated by Fig. 7 (before operation) and Fig. 8 (after operation). There was an associated fracture at the symphysis with considerable loss of bone. The operation was performed with a suitable splint *in situ*. Another example is illustrated in Figs. 9 and 10. The bony lesion in this patient was similar in nature. The functional capacity of both these patients has been completely restored.

The type of case suitable for the employment of a double flap formed in the gap and coincident with its closure is shown in Fig. 11. In Fig. 12 the flaps are shown in position immediately after operation. The under flap is pedicled and its raw out-turned surface is uncovered at its posterior part. The superimposed flap is of the sliding variety. Fig. 13 exhibits the pedicle cut, the spare skin being used to relieve tension in the neck. The associated bony lesion was a badly comminuted fracture of the lower jaw on the left side. Firm bony union had occurred before the operation was undertaken.

The combination of hinged and pedicled flap is shown in Fig. 14. In Fig. 15 the condition before operation may be seen, the skin margins being everywhere turned in and adherent to bone. The under flap is formed from the skin of the face and rotated, with its skin surface towards the nasal cavity, on a hinge formed at the lower part of the gap. This flap is entirely covered, as is the raw surface left by its formation, by the superimposed pedicled flap taken from the scalp. This flap was 7 inches long and its pedicle is shown before severance. The union has given way over a small area at the upper margin of the gap. In Fig. 16 the pedicle has been cut and the redundant portion of the flap replaced to make good the deficiency in the scalp.

Some gaps are more conveniently closed by means of double epithelialised flaps formed at a distance. Such a case is seen in Fig. 17. The tongue is protruding on the lateral aspect of the neck. The lower margin of the gap is dotted with displaced necrotic fragments of bone. Fig. 18 shows the condition attained before closure was attempted. Fixation of the bony fragments by a suitable splint has determined contraction of the tissues towards the fixed points, and new bone has spread along the whole length of the gap. The condition after closure of the defect and severance of the pedicle is illustrated in Fig. 19. The flap that was used in this case was fashioned with a single primary pedicle. The scar in the neck indicates the original site of the flap. Muscular control of the lips has been perfectly restored and complete restoration of mastication is assured.

Where, on account of the size of the defect, large flaps must necessarily be employed, it will be found advantageous

to utilise two primary pedicles. The type of case for which such a procedure is indicated is shown in Fig. 20. The soft tissues have been completely destroyed over the area illustrated, exposing an irregular bony bed made up for the most part of malar bone and posterior wall of the antrum. This patient, when transferred to my wards, had absolute trismus owing to cicatricial contraction. This was efficiently rectified and a splint inserted (Fig. 21). A double flap was fashioned having one pedicle at the upper part of the chest wall and another in the neck. These were stitched together, raw surface to raw surface. At a later date the chest pedicle was cut. Fig. 22 shows the flap swung into position, with the neck pedicle intact. The skin surface derived from the anterior chest wall forms the inner surface of the false cheek. In Fig. 23 the pedicle has been divided and the right angle of the mouth reconstituted. This patient was to have been sent away to be provided with a face mask. Other operations have been and remain to be performed before the case is finished. Even if, at the stage depicted, artifice had been invoked as a cosmetic aid, plastic surgery would have conferred upon this patient the inestimable advantage that his functional capacity, both as regards control of saliva and masticating power, had, by the use of his own tissues, been fully restored. It is certain that the resources of plastic surgery are adequate to deal effectively with numbers of cases for which various types of artificial apparatus are employed. Surgery alone can reconstitute; artifice must substitute. In some cases, undoubtedly, the best possible results will only be achieved by drawing on the resources of both.

The anaesthetics were most skilfully administered by Dr. Francis E. Shipway and Mr. Ramsey Phillips. Intratracheal ether has been the routine method adopted, not only for the type of case herein described, but also for such procedures as the taking of impressions, insertion of splints, and operative measures for the immediate reduction of deformity in old and recent fractures of the jaw.

The benefits that accrue from the use of this method cannot well be exaggerated. For the surgeon operating is rendered easy and comfortable in that all his energies, untrammelled by extraneous considerations, can be devoted to the immediate task in hand; the mouth is, as it were, a limb. For the patient nausea, vomiting, and post-anæsthetic complications are eliminated.

The marked tendency to keloid in some of the patients has led to the trial of methods for the alleviation of this disfiguring condition. Passive hyperæmia and ionisation have been employed without avail. The most successful results have been obtained by the use of X rays and radium. Dr. Robert Knox has very kindly carried out treatment by these agents in the electro-therapeutical department of the Cancer Hospital. His results clearly indicate that the most disfiguring scar can be effectively dealt with by these methods. The photographs were taken by Dr. A. Norman, to whom my best thanks are due for the time and labour devoted to their preparation. These have been, in most cases, taken very soon after operation. Considerable improvement in appearance invariably occurs after a few months and may be aided by growing a moustache or beard. In every case function has been completely restored or its restoration has been definitely assured. The care of these cases demands from the nursing staff the exercise of the greatest patience, and entails constant and scrupulous attention to detail. It is a great pleasure to acknowledge the whole-hearted enthusiasm with which they and my resident, Mr. T. H. Lunney, have devoted themselves to the work.

It may be stated, in conclusion, that the type of case herein discussed comprises one variety only of the cases admitted to my wards at the King George Hospital. They all have this in common, in that the plan of treatment for each individual is determined by conjoint consideration, conjoint aim, and conjoint action on the part of my dental colleague Mr. Bubb and myself.

Harley-street, W.

**THE LATE BENJAMIN POWER BEAMES BURROUGHS, M.R.C.S., L.S.A.**—Mr. Burroughs died on Feb. 16th, at his residence at Weston-super-Mare, in his seventy-first year. He was a son of the late Mr. R. C. Burroughs, barrister-at-law, and had practised in Weston for over 40 years, where he was much respected. He was for several years on the honorary staff of the Royal West of England Sanatorium.

**THE  
ANTIBODY CONTENT OF THE CEREBRO-  
SPINAL FLUID IN MENINGOCOCCAL  
INFECTIONS,**

WITH SPECIAL REFERENCE TO VACCINE TREATMENT.

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(A Report to the Medical Research Committee.)

THE vaccine treatment of many infective conditions, more especially of chronic infections, has now become a widely practised therapeutic procedure. It is a firmly established and well-known fact that a vaccine on injection into the tissues acts like all antigens do in stimulating the production of specific antibodies in the body tissues and fluids of the injected individual. Not only can the presence of these specific antibodies—whether bacteriolytic, agglutinating, complement-fixing, or opsonic—be readily recognised in the blood serum, but by the exercise of the appropriate technique their amounts can be determined with great accuracy. Certain of these methods, indeed, have now become the commonplace procedures of the clinical laboratory, being in daily use for the detection and differential diagnosis of many infective diseases.

There is also some evidence to show that these specific antibodies are not confined to the blood, but may also be found in the other body fluids, more particularly the lymph. An exhaustive investigation into their presence and abundance in various other body fluids, such as the cerebro-spinal fluid, the aqueous humour, the lacrymal fluid, ascitic, pleural, and pericardial fluids, and in various transudates and exudates, would probably throw much light on the exact seat of origin of these bodies.

The question of the presence or absence of these antibodies in the cerebro-spinal fluid becomes an important one in the consideration of the vaccine treatment—prophylactic or curative—of meningococcal cerebro-spinal meningitis, for unless the antibodies reach the interior of the thecal sac, and so be present in the cerebro-spinal fluid, the indications for the exhibition of the vaccine injected subcutaneously would be lacking.

Vaccines have already been administered in this condition, either alone or as an adjunct to other methods of treatment, but according to the official report of the Medical Research Committee on Cerebro-spinal Meningitis no very satisfactory clinical results have been recorded, and so no very definite indications or contra-indications for or against their use can be obtained on clinical grounds alone.

The opportunity of investigating this question experimentally was presented to me whilst working in the London District Cerebro-spinal Fever Laboratory at the Royal Army Medical College at Millbank last year in association with Captain Arthur Davies, R.A.M.C., who suggested this investigation to me, while Lieutenant-Colonel Mervyn Gordon, R.A.M.C., kindly supplied the materials employed.

Young rabbits of 1000 to 1500 grammes weight were inoculated with gradually increasing doses of meningococcus cultures until the blood serum showed a high grade of agglutination towards the strain of the organism injected, several different strains of the meningococcus being employed in the various experiments. The animals were then bled, the serum being employed by Lieutenant-Colonel Gordon<sup>1</sup> in the agglutination and absorption experiments, which proved that four chief strains or types of meningococcus were responsible for the cases of cerebro-spinal fever met with in this country.

The animals, along with a little of their sera and a culture of the infecting organisms, were then handed over to me. The cerebro-spinal fluid was obtained by puncture of the spinal theca through the occipito-atlantoid ligament, where spinal puncture is most easily performed in the rabbit. In some cases blood-stained fluid was obtained. This was at once rejected and only cerebro-spinal fluid free from any trace of blood was employed.

The agglutination titre of the blood and of the cerebro-spinal fluid was then ascertained, the macroscopic method of agglutination being employed. A suspension of a 24-hour culture of the injected coccus in normal saline solution heated to 65° C. for 30 minutes was employed, the heating being employed not only to kill the micro-organisms but also to inactivate the autolysin, for it has been shown by

Raymond Koch that such a heated suspension of meningococci keeps well and gives reliable results for many months. The results were read off after 24 to 48 hours as recommended by Kutscher. The results obtained are set forth in the following table:

*Table Showing Agglutination Titre of Serum and Absence of Agglutinins in Cerebro-spinal Fluid of Rabbits Injected with Various Types of Meningococcus.*

Expt.	Type of meningococcus injected.	Agglutination titre of serum.	Agglutination titre of cerebro-spinal fluid.
1.	Carter, Type I.	1 in 320.	Nil.
2.	Chase, Type III.	1 in 320.	..
3.	Shore, Type III.	1 in 256.	..
4.	McPhail, Type II.	1 in 256.	..
5.	Uninoculated control.	Nil.	..

The results obtained in these experiments show that although the serum of the injected animals exhibited a fairly high agglutination titre against the homologous types of meningococcus, the cerebro-spinal fluid in all cases showed no trace of agglutinating properties.

Hitherto very few investigations have been carried out on the antibody content of the cerebro-spinal fluid and these chiefly with *B. typhosus*.

Thus Rosenberg<sup>2</sup> studied the concentration of typhoid agglutinins in the body fluids of rabbits immunised against the typhoid bacillus. He found that the concentration of the agglutinins depends on their concentration in the blood, and that ascitic fluid and pleuritic and pericardial fluids contain a greater percentage of agglutinins than do cerebro-spinal fluid, aqueous humour, and urine.

Braude and Carlson<sup>3</sup> have shown that the serum, thoracic lymph, neck lymph, and pericardial fluid of normal dogs contain agglutinins for the typhoid bacillus, being most abundant in the serum, whilst the cerebro-spinal fluid and the aqueous humour possess no agglutinating properties. In dogs immunised against typhoid bacilli, however, they found that agglutinins were present even in considerable quantity both in the cerebro-spinal fluid and the aqueous humour.

Hughes and Carlson<sup>4</sup> investigated the haemolytic power of the body fluids of normal dogs and found that although the serum of the dog is haemolytic to rabbits' erythrocytes, no lysis of rabbits' corpuscles was produced by the cerebro-spinal fluid of any of the 15 dogs investigated.

Working with human body fluids Pick<sup>5</sup> and Levy and Geisler<sup>6</sup> have described the presence of bacterio-agglutinins in the cerebro-spinal fluid and aqueous humour, pericardial fluid, and various exudates and transudates in patients suffering from typhoid infections.

Kohler<sup>7</sup> also found agglutinins present in the cerebro-spinal fluid of one out of a total of ten typhoid patients, whereas the same observer records the presence of agglutinins in the blood of non-typhoid patients as well as healthy individuals to the extent of 15 per cent of the subjects investigated. It would thus appear that the agglutinins encountered by Kohler were not specific typhoid agglutinins.

The work of Cavazzini,<sup>8</sup> Capalbetti,<sup>9</sup> Petit and Girard,<sup>10</sup> Meek,<sup>11</sup> and Dixon and Halliburton<sup>12</sup> seems to show that the cerebro-spinal fluid is formed, in part if not entirely, by the secretory activity of the epithelial cells of the choroid plexus, which Mott<sup>13</sup> speaks of as the "choroid gland." Extracts of this body stimulate the secretion of the cerebro-spinal fluid, whereas the quantity of this fluid is not affected by lymphagogues, but is increased by pilocarpine and checked by atropine, and after the injection of pilocarpine the cells exhibit the typical changes met with in active glands after secretion.

Hence we may conclude from a consideration of these experiments that the weight of evidence goes to prove that bacterial antibodies do not pass over, at least in any quantity, into the cerebro-spinal fluid, and that therefore little benefit can be expected to result from the subcutaneous administration of vaccines in cerebro-spinal meningitis.

I beg to express my indebtedness to Captain Davies and to Lieutenant-Colonel Gordon for suggestions and assistance, and to the Medical Research Committee, under whose auspices this investigation was undertaken.

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# THE LANCET.

LONDON: SATURDAY, MARCH 17, 1917.

## The Training of the Disabled Soldier.

THE statement of Mr. Barnes, the Minister of Pensions, which was published in THE LANCET last week, on the provision to be made by the Government for men disabled in the war was not made too soon; it was much expected, and will be welcomed by all interested in the care of the war cripple. The War Office, said Mr. Barnes, has undertaken to retain the disabled man as an in-patient so long as there is accommodation for him, and during this time to provide him with manual curative treatment, or, in other words, trade workshops. In order that the Pensions Ministry may get in touch with the disabled man during his period in hospital, Mr. Barnes has adopted the scheme of the Disabled Soldiers Aid Committee, the voluntary body which for some time past has sent representatives to the various London military hospitals to interview the men before their discharge with a view to helping them to find training in skilled trades and subsequent remunerative employment. This visiting will now, therefore, become a general routine throughout the country and be done by members of the local War Pensions &c. Statutory Committees. After discharge from hospital the War Office has accepted responsibility for the man's further treatment as an out-patient in his own district; failure to accept such treatment will subject the man to the risk of losing half his pension, while the discharged man who trains for a new or more skilled occupation will have the inducement of receiving, in addition to his full pension and allowances, free tuition and a small bonus.

This marks a great advance, but it cannot be said that the scheme, as at present outlined, affords a complete solution of the existing difficulties. One of these, which has been experienced by the military authorities in all combatant countries, is to induce the convalescent men to attend the curative workshops where these exist. In the Hammersmith Military Orthopaedic Hospital this difficulty has been solved to a considerable extent by the granting or withholding of the special privileges which appeal to the soldier's mind, such as the wearing of khaki in place of hospital blue and the award of extra leave. Unfortunately, the limbless man does not respond in the same way to these attractions and some other suasion must be applied—a matter for the military authorities rather than the Pensions Ministry to devise. A more concrete difficulty is in regard to the provision of training facilities. It is, of course, possible to provide training in a trade at an existing local technical school or polytechnic, and at the same time

medical treatment at another local institution; but it is evident that much effort will be required to coördinate the two, and the cripple will inevitably lose more time each day than if treatment and training were provided under the same roof. At present, too, there is little indication that the local technical institutions are in a position to provide adequate facilities for training except perhaps in the largest centres of population, where, and where only, the different groups of disabled men are sufficiently represented to form classes in the various subjects.

In the direction of continued in-patient treatment, with all its attendant advantages, a promise of better things may be read into Mr. Barnes's announcement of the formation of a committee directly responsible to the Ministry of Pensions and charged with the task of providing institutional treatment for disabled soldiers after their discharge. The first of these residential institutions which is now approaching completion will deal with a hundred neurasthenics, with whom are to be associated half the number of men who have lost a limb or the use of a limb, the admixture of patients who have only or mainly physical ills to contend with being designed to relieve the mental atmosphere. We may reasonably expect that adequate workshop accommodation is being provided, and that this institution will be the forerunner of others scattered over the country. As the element of treatment is still the most important one in these residential institutions, we cannot help expressing some surprise that Mr. Barnes, in enumerating the personnel of his advisory committee, did not mention the existence of a medical member upon it. There must surely be some officer of a Command Depot with the necessary experience and administrative ability to qualify for this position. When the advisory committee has done its work we need no longer fear comparison with the French *écoles professionnelles* and the agricultural schools in that country for disabled men. At present, although generous financial provision has been made, the provision of technical re-education of the wounded in this country is below the level of that provided by continental nations, enemy and allied.

## Plastic Surgery of the Face.

THE war has afforded sad but great opportunities for the display of surgical skill in the refashioning of the face, and two articles in the present issue of THE LANCET—one by Mr. PERCIVAL COLE and the other by Captain H. D. GILLIES and Captain L. A. B. KING—will serve to show how much may be done by well-directed knowledge and skill in the obliteration of the ravages produced by weapons of war. It was natural that the face should be the region where plastic surgery should first gain successes, for inevitably it would be in this region that the earliest attempts would be made. The classic labours of TAGLIACOZZI were mainly directed to the replacing of noses and lips which had been removed either by injury or by disease. The results of operative interference were here, on the whole, disappointing. In India

at an early date attempts were made to replace lost noses, for in some parts of that country there is much scope for this operation, as slicing off the nose is the recognised method by which an irritated husband signifies his disapprobation of his wife's conduct. Colonel D. F. KEEGAN, I.M.S., has written in our columns and elsewhere very fully on the rhinoplasty designed to repair the husband's brutalities, and it is interesting to see that the treatment of some of our military patients to-day follows some of the methods of technique which he described.

In those wounds of the face inflicted upon patients who have returned to this country from the front for treatment the injury may be confined to the soft parts, in which case the art of the surgeon suffices in most cases to restore the appearance to a very great extent. In the slighter cases it may be sufficient to suture the edges of wounds, when there has been but little loss of tissue; but when the destruction of skin and other tissue has been great, then it becomes necessary to interpose skin from elsewhere to fill the gap, and these flaps may be taken from the neck or even from the chest in the frequent classes of injury where the lower part of the face has been mutilated. The flaps may be transferred by sliding, or transposed by the aid of a pedicle. When the mucous membrane of the mouth is intact, a simple flap of skin is quite sufficient to give good cosmetic results, but when, as occurs in so many cases, more or less of the mucous membrane has been lost it will be essential that a double flap should be employed, one flap being placed with its epithelial surface directed towards the mouth, so as to take the place of the lost mucous membrane, while the other flap is so applied that its epithelial surface is directed outwards. In some cases the raw surfaces of the two flaps are placed together at the same operation, while in others it may be advisable to insert the deeper flap at one operation, while the more superficial piece of skin is not applied until a later date. In both the articles published this week examples of the procedure in question are figured. The great need for the insertion of a flap of skin to replace lost mucous membrane depends on the fact that it is not sufficient to have a good cosmetic result, but it is essential that the functional result shall be perfect, for the operation has been useless if the jaws are held together immovable by a dense mass of cicatricial tissue, such as would follow healing after a great loss of the substance of the cheek were no new tissue interposed. Function in all cases is of more importance than appearance, though nearly always, if due attention be paid to function, the cosmetic result can be made satisfactory by ingenuity, patience, and the intelligent co-operation of the surgical with the dental expert. Sometimes one plastic operation will suffice; but as a rule more than one operation is needed, and not rarely many are required to obtain the best results. When in addition to the damage to the soft parts the upper or the lower jaw has been injured, the task of the surgeon becomes more

difficult still, and in all but the slightest cases he must, in order to attain success, have recourse to the assistance of the dentist. Should there be nothing more than a simple fracture of the jaw it may suffice to keep in position the parts of the broken bone, but nearly always there has been real loss of substance, and it is moreover rare for the fractures not to be compound, and comminution is almost the rule. In circumstances like these some mechanical support is necessary, and this must be provided by the dental expert. Such a support should be applied early, before any elaborate operation is undertaken to close the rent in the lips or cheek; for if it be postponed until some time after the operation is done, already no small degree of contraction will have taken place and the result will not be satisfactory. This point is emphasised by both Captain GILLIES and Mr. COLE. The planning and the fixing of the mechanical support are of the greatest importance and need meticulous care; but the results are commensurate with the care taken, and they are often almost miraculous. A glance at the illustrations accompanying the two papers we have mentioned will show clearly the marvellous improvement which can follow operations for bullet and shell wounds of the face and jaws. There seems to be no well-defined limit to what may be done given the requisite time, and cases which to the uninitiated must appear to be absolutely hopeless, may, after the fitting of dentures or other prosthetic appliances and after one or many operations, show but few and inconspicuous signs of the harm wrought by the projectile. There is one point in the plastic treatment of these extensive injuries to which sufficient attention is not always given, and that is the preservation of the buccal sulcus: for if care be not taken to see that the buccal sulcus is preserved, it becomes exceedingly difficult, if not impossible, to fit a denture to that side of the mouth, and functionally so far the operation has failed, for that side of the mouth cannot be used.

To sum up: In any but the slightest cases and those where there is only injury to the soft parts, it is above all things essential that the surgeon should invoke the aid of the dental expert. The prosthetic appliance needed should be fixed before the healing of the wounds has formed a cicatricial mass which will need stretching if any really useful result is to be attained, for it is far better to prevent cicatricial contraction than to have to stretch the scar tissue after it has formed. With skill and care and time results can be obtained which can hardly be credited by those who have had no opportunity of seeing them.

CENTENARIANS.—Mr. Thomas Pyper, for many years head gardener at Minterne House (Lord Digby's Dorset residence), has recently celebrated the 100th anniversary of his birthday.—Mrs. Anna Rogers, of Falmouth, celebrated the 100th anniversary of her birthday on Feb. 28th.—Mrs. Elizabeth Selley, who was born near Launceston, Cornwall, died at Gloucester on Feb. 2nd in her 102nd year.—Mr. John Hamlin, the oldest resident in Somerset, died at Shepton Mallet on Feb. 5th in his 102nd year.—Mr. James Newth died at the Grammar School House, Dursley, on Feb. 13th in his 103rd year.

## Annotations.

"No quid nimis."

### THE INFLUENCE OF DRESSINGS ON THE ANAEROBIC FLORA OF WOUNDS.

THE Tetanus Committee of the War Office are desirous of obtaining evidence of the persistence of anaerobic bacteria in wounds, and of the effect of various methods of wound dressing on the persistence of these anaerobes. They consider that if a sufficient number of pathologists would make routine observations for a short time upon two or three wounds each, much valuable evidence would be forthcoming, especially if the examinations were carried out in a similar fashion. The Committee therefore suggest a routine method suitable for the examination of one case, which could be extended to other cases during the same period if time permitted. The essential points to be noted for each case are : (I.) The type of dressing in use for the wound examined—e.g., (a) hypochlorite solution, (b) hypertonic salt solution, (c) salt pack, (d) peroxide, iodine and normal saline, (e) coal-tar derivatives (cresol, &c.), (f) flavine, brilliant green, &c. (II.) The presence or absence of spore-forming organisms as determined by : (a) direct films of wound discharge; (b) anaerobic meat broth cultivations. The following points are to be specially noted. 1. The presence or absence of spore-forming organisms and type of sporulation—e.g., (a) end spore, round or oval; (b) subterminal end spores (of which a small portion of stained organism can be seen beyond the spore); (c) central spores, including clostridial spore; (d) motility; (e) reaction to Gram's stain, noting morphology of organisms—viz., slender, thick rods, cocci, &c. 2. Changes in the meat medium: (a) reddening, (b) blackening, (c) gas formation, (d) digestion. A form of report is being issued to be returned when filled up to Surgeon-General Sir David Bruce, Royal Army Medical College, Grosvenor-road, London, S.W.

### THE DIETETIC VALUE OF ROOTS AND TUBERS.

THE prospect of a serious shortage in the potato supply is pressing into service other vegetables of the sort that may be substitutes. The general drawback to them all is the very large percentage of water which they contain compared with the potato. The potato itself contains on an average 75 per cent. of water, which, however, is much the same proportion as is contained in raw meat, while the turnip contains as much as 90 per cent. of water, which is 2 or 3 per cent. more than is contained in a fluid such as milk. The apparent solidity of the turnip is, in fact, remarkable having regard to its large percentage of water. Unlike the potato, however, the turnip or swede contains no starch, the predominant constituent of the potato, the carbohydrates present being in the form of sugar, and in the process of boiling much of this sugar is lost. The same is true of the beet-root, which, of course, is very rich in sugar. The carrot also contains a relatively large amount of sugar, while its percentage of moisture is less than that of the turnip but 10 per cent. more than that of the potato. The parsnip contains even more sugar than the beet, but rather less water. The protein value of all these vegetables is poor; they are valuable chiefly as sources of carbohydrate

in the form of sugar. They are bulkier foods than the potato owing to their large holding of water. The onion, containing as much as 90 per cent. of water, shows a small dietetic value, and its mission would appear to be rather that of a condiment than of a nutrient, and a very wholesome and serviceable condiment it is. There is one constituent of root foods which is sometimes overlooked, and which may have a definite dietetic importance, and that is the curious carbohydrate known as pectose, which appears to replace starch in certain vegetables, and notably the turnip. Pectose adds to the mucilaginous character of the puree, and it is the foundation of the gelatinising property of cooked fruit juices. The pectins, in fact, form gels, to use the modern language of colloidal chemistry. It is possible that this property of the pectins renders them a valuable adjuvant in the metabolic process apart from the consideration of a direct carbohydrate value. The word food commonly conveys a substantial material, but we cannot deny the importance of certain constituents in comestibles which, though they may not directly nourish, yet afford valuable, if not essential, assistance in the process of nutrition.

### THE LOUSE PROBLEM.

A DISCOURSE was delivered recently on the louse problem before the Section of Epidemiology and State Medicine of the Royal Society of Medicine by Mr. A. W. Bacot, entomologist to the Lister Institute, when the lecturer dealt with a subject of great importance in a thoroughly practical style. After setting out the points in the natural history of lice which concern all questions of prevention or cure of the evils due to lice—for example, their methods of pairing, their proceedings when egg-laying, their fecundity and fertility, their length of life, and their general habits—Mr. Bacot came to the following conclusions :

Eggs take 7 or 10 days to hatch under normal conditions—i.e., in clothing that is constantly worn; if discarded and allowed to cool for a period each day the time of hatching may be extended for five weeks.

Active lice can exist without food, and apart from any host, for periods of up to 9 days.

Young lice take from 10 to 14 days to attain sexual maturity.

Females, after attaining maturity, require 2 to 4 days before they commence to oviposit.

Egg production cannot take place without food, or under cool conditions (below 65° F.).

Eggs laid by unpaired females do not hatch.

Impregnation is not effective for more than 20 days.

As many as 10 or 12 eggs per day may be laid by each female.

A total of 300 eggs may be laid by one female.

The female after maturity may live for 46 days.

Before the close of her life a single female may have 4160 living offspring.

With regard to prevention Mr. Bacot pointed out that lousiness is a sign of a low standard of civilised life, and that the circumstances of war, by rendering the washing and changing of garments and bedding an erratic or occasional proceeding, produces such a standard on all the war fronts. The louse problem is solved, he suggests, in proportion as the armies are able to conduct campaigning under a civilised standard of life, which may be possible where the battle-front is more or less fixed and contiguous to resourceful bases, as in the West, but quite impossible where it is in motion, or relying upon long lines of difficult transport. Mr. Bacot, who has a neat turn of expression, pointed out that "it is one of the peculiarities of the destruction of insects that economy of thought

and extravagance in practice should be so general," and he finds that to the troops actually in the trenches the authorities have not had the prudence to issue a sufficient supply of insecticides, and have not recognised that, while all the known insecticides are defective in one direction or another, their imperfections may be counterbalanced by complementary use. Many of these preparations, employed by themselves, represent vain extravagance, but reinforced by others they constitute a valuable part of treatment. Slow acting and relatively stable remedies should be used together with those of quick action though short duration. In his opinion the treatment of discarded clothing should, wherever possible, be by dry heat, and, still with an eye to waste, he tells the story of an experimenter who found that "cylin water when cool was not effective, but became so when heated to 60° centigrade"—it had already been pointed out in his own paper that dry heat at 60° centigrade killed the nits.

Mr. Bacot's experiments upon insecticides were carried out upon his own person by the suspension between shirt and skin of gauze bags containing active lice; while in order to gauge the comparative value of a number of different remedies under practical conditions, and to determine their range of action, he constructed an apparatus to suspend in front of the body so that insects could feed during the progress of the tests. He came to the conclusion that however valuable and interesting from the view of pure science many of the published papers concerning the relative efficiency of various substances may be, they have but small practical value, owing to a want of appreciation of the essential facts connected with their use—namely, that remedies have to be applied between the clothing and surface of a more or less rotund body, the temperature condition there being in the neighbourhood of 87° to 92° F. What effect their vapour may have in closed tins, under bell jars, or when the lice are suspended within a short distance above the insecticides is beside the question; all depends, he shows, upon the concentration and duration of the vapour caused by the quantity applied to any given area, and the effective diffusion range around this area.

#### A DOUBLE RADIAL ARTERY.

AN instance of this very rare condition has recently been observed by Professor Edward Fawcett in the dissecting-room of the medical school attached to the University of Bristol. It was also associated with high bifurcation of the brachial artery, a condition which may usually with certainty be ascribed to persistence in some form or other of a *vas aberrans*. This high bifurcation is, in Professor Fawcett's experience, frequently associated also with an increased number of heads of origin of the biceps muscle. In this case three heads of origin were present.

The *vas aberrans* left the brachial artery at the lower border of the tendon of the teres major muscle, ran downwards superficial to the median nerve, and at about the middle of the upper arm crossed the superficial surface of the biceps to reach its outer side at the bend of the elbow. Below this point it bifurcated into two branches of equal calibre, one, more medial, which ran the course usually associated with the radial artery, the other, more lateral, which running by the side of the radial vein, superficial and lateral to the brachio-radialis muscle at the junction of the middle and lower thirds of the forearm was joined company by the radial nerve, and with it reached the back of the wrist. The branch first described turned backwards under the tendons of the extensor ossis metacarpi pollicis

and extensor brevis pollicis, having previously given off the anterior radial carpal and superficial volar branches; later it terminated under the extensor tendons at the back of the wrist as the posterior carpal artery, previous to which having given off the dorsal arteries of the thumb. The branch secondly described, having reached the wrist superficially, at once made for the proximal end of the first interosseous space, through which it passed to form the deep palmar arch, previous to which it gave off the dorsal artery of the index finger. From their behaviour and their equality in size one is justified in regarding each of these branches as a radial artery, hence the superscription—double radial artery.

The condition is naturally one of some interest to clinicians. Professor Fawcett states that he has not once met with it in a period of 30 years' dissecting-room experience, although he has been asked if such condition might exist by more than one clinician.

#### THE TENNENT CHAIR OF OPHTHALMOLOGY.

Dr. Gavin Paterson Tennent, who died in 1913, left £25,000 to the University of Glasgow for the establishment of a department of ophthalmology and for the foundation of a chair of Ophthalmology in the University. The salary of the new professor has been fixed at £500 a year, and his duties are "to apply himself to the promotion of higher study in ophthalmology and to the advancement of knowledge by means of scientific observation and research in relation thereto." The election to the chair is vested in a board of seven curators, four to be nominated by the University Court and three by the directors of the Western Infirmary. Glasgow and ophthalmology alike are to be congratulated on this munificent endowment. Glasgow is admirably adapted for the purpose, since it possesses a large and flourishing medical school and has a wealth of clinical material. There is therefore every probability that the Tennent Fund will be put to the most advantageous use, for it is of the greatest importance that the more purely scientific aspects of advanced medical studies should be kept in intimate touch with practical clinical work. We noted recently that a University Court ordinance has been presented for the foundation in Edinburgh of a chair of Tuberculosis, showing that this opinion is shared by the Scottish leaders of thought.

#### FACTITIOUS ELEPHANTIASIS.

AT a recent meeting of the Académie de Médecine of Paris Professor Meriel, of Toulouse, called attention to what appears to be a new factitious condition, induced for the purpose of avoiding military service. Among the wounded who came before a military board of which he was a member he saw a number of cases of elephantiasis of the limbs, predominating at the extremity, which followed a slight injury of warfare, such as wounding by a small fragment of shell or a burn of the second degree. The enormous oedematous infiltration, much out of proportion to the gravity of the injury, excited surprise. When a series of such cases came before him he began to investigate them. He found that the oedema was induced by constriction of the limb for several days with a bandage. In some cases a layer of cotton-wool was first interposed so as to prevent any marks of the bandage. Even when no trace of constriction could be found the appearance was characteristic; the oedema was sharply demarcated near the root of the limb by an elevated margin. This is never present in oedema due to

disease. The proposal to apply a plaster apparatus or its application often led to avowal of the cause. If it did not, the rapid disappearance of the œdema under the apparatus betrayed its origin. When the œdema was recent it was entirely curable, but when it had been maintained for a long time trophic lesions which did not disappear, or took a long time in doing so, were the result. The œdema affected the hand or foot and extended up the forearm or leg. It was of variable consistence, sometimes hard, but more often pitting on pressure. The skin of the affected part was glossy, thinned, cold, sometimes bluish, and at other times white. Whatever the upper limit the œdema terminated by a well-marked ridge above which the tissues were quite sound. Movements of the fingers were much diminished, and the fingers themselves were enlarged and separated from one another by the enormous lymphatic infiltration. The latter produced in the long run trophic lesions. Their existence was shown by radiography, which revealed decalcification of the bones of the hand and foot which was exactly the same as in a recent work on nerve lesions Madame A. Benisty has figured in a case of wound of the median nerve. In both cases the decalcification predominated in the phalanges and the head of the metacarpal bones. It is important to note that the œdema is not due to the neuritis, but the neuritis to the œdema. The neuritis does not recede as quickly as the œdema, but outlasts it for a greater or lesser period producing a disability desired by the subject. The diagnosis can be made by isolating and watching the patient so as to prevent him from constricting the limb or by enveloping the latter in plaster-of-Paris, which in the case of the lower limb should reach up to the pelvis and in the upper limb to the chest.

#### THE CHEMISTRY OF WAR-TIME WHISKY.

THE dilution of spirits with water, and particularly of malt whisky, down to the degree demanded by the Defence of the Realm Act has effected some important changes in the characteristics of this alcoholic liquor which are worth notice. It may be remembered that present supplies to the public cannot be sold at a greater alcoholic strength than 30° under proof spirit, which means about 33 per cent. of alcohol by weight or 40 per cent. by volume (70 per cent. proof spirit), whereas before any demand for dilution came into force the average strength of the spirit sold was about 40 per cent. by weight of alcohol or 48 per cent. by volume (84 per cent. proof spirit). This means that 20 gallons of water may be added to 100 gallons of the old-strength whisky to produce 120 gallons of a spirit diluted in accordance with the requirements of the Act. The dilution amounts, in fact, to the addition of about a fifth part water, so that a dozen bottles of the old-strength spirit would make about 14 bottles of the diluted spirit. If whisky were pure alcohol this dilution would give no trouble, but, as everyone knows, genuine malt whisky is not pure alcohol; it is a complex containing certain by-products of fermentation and distillation held in solution in the alcohol. Just as with tinctures the addition of water throws out oils and other active substances, so it happens with malt spirit. Fatty substances, resins, and other products contrive to make the spirit opalescent when water is added to

the extent demanded and when allowed to stand. The subsequent elimination of these substances by filtration carries out a material portion of the flavouring substances derived from the malt, and the ethers are to some extent destroyed by this process. This is what the merchants have been compelled to do; it was easy enough to water down the malt spirit to the required standard, but the mixture became opalescent and had to be carefully filtered before it could be bottled in a satisfactory condition. The result is that the whisky now supplied to the public is bright and clear and remains so even on further dilution, while much of the characteristic malty flavour has been withdrawn. This change in the character of whisky may have its hygienic advantages, inasmuch as it may not satisfy the taste of the habitual consumer, and may induce him to drink it less frequently or not at all.

#### THE FREE SUPPLY OF ANTITOXIN IN CANADA.

THE Provincial Board of Health for Ontario has now completed a contract for a year for the supply of diphtheria antitoxin, tetanus antitoxin, anti-meningitis serum, small-pox vaccine, and Pasteur preventive treatment for rabies. We announced early last year the intention of the Board to make a gratuitous distribution of these serums, and our readers will like to know the details of such an example of public forethought. These serums, as well as mixed typhoid and paratyphoid vaccines, have been supplied free to the public all over the province of Ontario. Diphtheria antitoxin costs the Board 15 cents per 1000 units, in vials, tetanus antitoxin 30 cents per 1000 units, in vials, anti-meningitis serum \$1 per 20 c.c., small-pox vaccine 4 cents per capillary tube, and Pasteur treatment \$15 per person treated. Mixed typhoid and paratyphoid vaccine is prepared and supplied free by the Board's laboratory, in Toronto. The aggregate cost of supplying the province for the year is about \$40,000, or about one-quarter of the cost under commercial prices. All these products, except typhoid vaccine, have been, and will be for the future, obtained from the University of Toronto, and are prepared at the Connaught antitoxin laboratories about 12 miles outside of the city. Since the war began the Board has supplied all the typhoid and paratyphoid vaccine used by the Canadian troops (some 400,000 doses) free of charge. The enterprise of the Board has been the subject of well-deserved appreciation from the public and the medical profession.

Colonel J. T. Fotheringham, C.M.G., who came over in medical charge of the 2nd Canadian Division, has been invited to deliver the next Cavendish Lecture of the West London Medico-Chirurgical Society about the middle of June. The subject of the lecture will be the modern organisation of the medical service at the front.

**LITERARY INTELLIGENCE.**—The first number has just appeared of a new journal of general physiology, *Archives Néerlandaises de Physiologie de l'Homme et des Animaux*, edited by W. Einthoven, H. J. Hamburger, C. A. Pekelharing, G. Van Rijnberk, et H. Zwaardemaker, and forming part of a series of scientific archives published by La Société Hollandaise des Sciences à Harlem. Four numbers make up the volume, for which the subscription is 15 florins payable to Martinus Nijhoff, Lange Voorhout 9, The Hague, Holland.

## THE CONTROL OF VENEREAL DISEASES.

### *The Preventive Treatment of Venereal Diseases in Australia.*

Temporary Lieutenant-Colonel James W. Barrett, R.A.M.C., has sent us the following letter for publication:

In consequence of the appearance of a leading article in your issue of Jan. 13th on the subject of venereal prophylaxis, I venture to place your readers in possession of the facts relating to the steps which have already been taken in Australia. In the State of Victoria the Government has done much in the direction of investigating the extent of distribution and in educating the public respecting the nature of venereal diseases. The Governmental action was the result of a medical campaign of 20 years' duration, details of which are set out in the Proceedings of the various sessions of the Australian Medical Congress and in an article written by myself and published in Bedrock early in 1913. It was the action of the Victorian Government which, to some extent, influenced the appointment of the British Royal Commission. In 1914, however, it was found that the Government was hesitating respecting publication of the methods relating to prophylaxis, and consequently a small committee of medical men and women (of which I was a member) was formed and determined to take action on their own responsibility. They accordingly drafted the appended circular and arranged with the leading chemists in Melbourne to supply the articles necessary for the prophylaxis of venereal diseases, and to issue the leaflet with the articles purchased.

Before doing so, however, information relating to the step proposed to be taken was sent to every medical practitioner in the State of Victoria and to every member of the clergy, with a request for an expression of opinion whether a better method could be devised. A conference with the representatives of the Council of Churches made it clear that, whilst the clergy disliked the proposal, they were unable to suggest any alternative method; action was accordingly taken. In the course of the discussion the medical representatives made it abundantly clear that the principles which must underlie the suppression of venereal diseases are: 1. The complete separation of the moral from the medical problem, and the clear recognition of the fact that the world will not be rendered more or less moral by the abolition of venereal disease. 2. The fact that the fear of the acquisition of venereal disease is no effective deterrent to immorality; to such slight extent as it is a deterrent the advantages are more than counterbalanced by the wholesale infection of the innocent which goes on at present. 3. That as the organisms which cause venereal diseases grow almost exclusively in the genital passages of men and women, it is quite clear that the intelligent use of prophylaxis would in a very few years eliminate these diseases altogether; in fact, it is doubtful whether there are any other contagious diseases which could be eliminated with greater certainty.

It is to me an article of faith, fully discussed in the literature referred to, in the *Australasian Medical Journal*, in the columns of the *Melbourne Argus*, and elsewhere, that a resolute and straightforward attack on this problem on the lines of prophylaxis offers the only reasonable means of extirpating these diseases. The other and indirect means of dealing with it have a value, and education respecting the nature of the diseases is especially useful, and it is the lack of knowledge on the part of the public which has caused the failure of past campaigns. Yet these means alone are somewhat disappointing in their results as our experience indicates. The words used by Huxley in another connexion may be applied with great force to this colossal evil: "There is no alleviation for the suffering of mankind except veracity of thought and action, and the resolute facing of the world as it is, when the garment of make-believe by which pious hands have hidden its uglier features, is stripped off."

May I commend the foregoing to the consideration of earnest men and women who are now publicly facing this disagreeable but vital undertaking.

The Australian circular runs as follows:—

#### WARNING: VENEREAL DISEASES.

Irregular sexual intercourse involves a considerable liability to infection with gonorrhœa, or syphilis, or both. Of those who are infected a portion are never cured; the consequences are serious so far as they are concerned, and still more serious as regards those to whom they may communicate these diseases later on. A single exposure to infection may result in life-long illness.

Incontinence is not in any way necessary for purposes of health, and the advice the medical profession would give to all would be abstinence from intercourse other than in marriage. If you desire in the future healthy children and a healthy wife, you are strongly advised to remain continent; at the same time, if you determine to take the risk, it is your duty, not only for your own sake, but for that of other people, to avoid infection, and infection can be avoided or lessened in frequency by following the procedure indicated in the following.

*Instructions for men.*—Immediately after intercourse thoroughly wash the genitals with soap and water, pass urine, and then dry the parts, especially the opening of the passage. The washing must include the parts under the foreskin, which must be drawn back. Then dip the wisp of cotton-wool into the liquid supplied and gently pass it into the opening by a twisting movement; pass it in for a quarter of an inch, and allow it to remain in position for three or four minutes before removal. If the opening or "eye" of the penis is so small that this cannot be done a few drops should be inserted with a medicine-dropper. The ointment is then to be used by rubbing it in thoroughly and firmly over the whole penis, but more particularly the head, especially if a crack, abrasion, or small tear is noticed anywhere. The foreskin must be drawn back to allow of this being done properly. A small portion of the ointment should be allowed to remain in opening of the canal. The value of these simple precautions depends on the rapidity with which they are adopted after intercourse. The sooner these steps are taken the less is the risk of infection. The applications should be made in the order indicated. The longer they are deferred the greater the risk.

*Instructions for women.*—If there has been any risk of infection as soon as possible after connexion douche well, using a quart of hot water and putting into it two teaspoonsful of tinct. of iodine. Then smear the calomel ointment round the outside of orifice and well up over the front.

The ointment: 30 per cent. calomel; the solution: 20 per cent. argyrol. (This may be made into a jelly with glyco-gelatine.) These articles are now sold by leading chemists.

#### *Resolution of the Royal Society of Medicine.*

At a recent meeting of the Council of the Royal Society of Medicine the following resolution was unanimously passed:—

That, in view of the grave national dangers arising from the neglect, or the improper treatment, of venereal diseases, the Council of the Royal Society of Medicine is strongly in favour of legislation for the purpose of rendering it a penal offence for any person other than a registered medical practitioner to treat or advise concerning the treatment of these diseases, or to sell, supply, or dispense drugs as a remedy for venereal diseases, unless the said drugs are supplied on the prescription of a registered medical practitioner, and only for the exclusive use of the person for whom the said prescription was intended.

#### *The Y.M.C.A. and Venereal Diseases.*

The recent report of the Microscopical Section of the Y.M.C.A. to the National Council of Associations states that there is much evidence among the men in camp that venereal diseases are spread through ignorance and thoughtlessness. At the exhibitions one member of the party makes it his duty to exhibit bacteria, and amongst them the germ of syphilis, with a view of opening a discussion among the men on the subject. The younger soldiers and sailors invariably put questions indicating a belief that brothels can be visited with impunity. Statements of fact illustrated by the microscope are then made by the exhibitor to show that such beliefs are unfounded and likely to lead to disaster.

#### *Outfit for the Treatment Centre.*

With commendable enterprise the Holborn Surgical Instrument Company (26, Thavies Inn, London, E.C.) have issued a 16-page catalogue of apparatus and remedies suitable for a venereal treatment centre. The cover describes the "606 Apparatus, Military Outfit," as used at the Military Hospital in Rochester-row; two pages follow on syringes and needles; then the drugs, new and old, in various forms; general apparatus, urethral instruments, a special "606 table" with hinged arm rests; ending with a complete estimate of the outfit required under three heads: (1) the 606 and mercurial injection room; (2) the gonorrhœa treatment room; (3) apparatus for the Wassermann test and dark-ground work. The list will be of use to centres not already fully equipped.

## PARIS.

(FROM OUR OWN CORRESPONDENT.)

#### *The Aphony of War and Laryngeal Tuberculosis.*

AMONG the accidents attributable to the war one of the most unexpected and difficult to interpret is aphony. It is not a rare accident. Dr. G. Liébault, chief of an oto-rhino-laryngological centre, has made a special study of these cases. Some of them may be attributed to a nervous traumatism caused by the bursting of the shells, but the majority of patients state that their aphony has followed on the fatigues and chills of trench life. The diagnosis of simple nervous aphony has frequently been established, but many also are under suspicion of a commencing laryngitis. When transferred from service to service these men are incompletely treated and do not improve. They are as a rule exhausted; they have often been several months in the trenches; they are thin, physically depressed, and in need of rest; they have a cough and a hoarse voice. It is natural for the doctor who sees them to conclude that the bronchitis

and laryngitis, along with fatigue and emaciation, are evidence of a tuberculous affection. It is, however, imperative that the larynx should be completely examined, and it may then be found that the patient is by no means tuberculous. M. Liébault has successfully treated ten soldiers who had been under care at several hospitals and were well on their way to being discharged. Without exhaustive examination these cases should not be labelled as bacillary and discharged.

#### *Extraction of Projectiles.*

M. René le Fort has several times essayed with success the extraction of projectiles from the root of the lung. He considers the best means of access is the anterior flap, comprising the second, third, fourth, and even the fifth ribs, and turned outwards. The lung may readily be displaced, and both surfaces of the hilum reached from before and behind. The after-treatment of the operation, which may itself be critical, is generally simple, although the interference is more serious than in the case of projectiles in the body of the lung. To reach projectiles situated on one or other side of the vertebral column in front of the transverse processes M. Salva Mercadé holds that the sub-peritoneal route presents undoubted advantages. The peritoneum is easily separated, and when turned back with the contained viscera an extensive view is obtained of the posterior abdominal wall. M. Mercadé employed this method on a man sent to him with a radiographic note stating that the projectile was situated 7 cm. deep from the anterior abdominal wall measured from a point two finger-breadths below and to the right of the umbilicus, and 8 cm. from the posterior surface of the body. The projectile was found in the psoas at the level of the fourth lumbar vertebra, and the patient made a good recovery.

#### *Artificial Limbs and Muscular Re-education.*

Professor Amar, analysing, by means of his dynamographic footpath, the locomotion of amputation cases, has thus passed under review various types of prosthesis—artificial legs, articulated and rigid, orthopaedic boots, and the like—supplied for amputations of thigh, or leg, or for crippled feet. He finds that the curves of effort registered show that at present no model, either French or foreign, has realised conditions of walking approaching the normal. The characteristics of the pathological gait are still to be noted; inertia, lack of stability, compass movement of the legs in progressing, and rapid fatigue. From Professor Amar's tracings it results that, in spite of half a century of experience, the artificial lower limb is still highly irrational and little in harmony with the physiological laws of locomotion and of the conservation of energy. Dr. Charmot has made a study of the professional re-education of one-armed agricultural labourers. According to the latest figures agricultural labourers make up nearly two-thirds of the war cripples' and of amputation cases the upper limb accounts for about two-thirds. Thanks to modern artificial aid, it can be safely affirmed that all labourers retaining as much as one-third of the crippled arm can and should remain in agricultural pursuits after suitable re-education. To control the results obtained competitions have been organised by the Society of Technical Instruction of the Rhône and the Association of Assistance of the Mutilated at Lyons. At the first of these meetings 12 men presented themselves. They were required to dig and to reap. In digging, those who had lost an arm got through their work in a shorter time than those who had lost a forearm, and even than normal men. The second fact is explained by the intensity of work due to competition, and the first by the fact that the movements of an arm stump are simpler and more limited than those of a forearm stump. In reaping, those who had lost an arm or a forearm reaped 4 ares in about an hour, while a normal individual, doing average work, only reaps in the same time 3½ ares. Of course, in a competition the work is of short duration and intensive. But tests of longer duration were also tried. Thus four one-armed patients reaped between them in three days 1½ hectares working from five and a half hours to six hours a day. These men rapidly reach the stage of doing whole days' work without fatigue. Their mental outlook is a matter of importance. They are easily distressed, often embittered. This must be borne in mind and their training based on physiological data, taking care never to reach the limit of fatigue, and to surround the crippled with an atmosphere of sympathetic encouragement.

## THE SERVICES.

### ROYAL ARMY MEDICAL CORPS.

Temp. Capt. F. J. Ewing, C.A.M.C., to be Deputy Assistant Director of Medical Services.

Lieut.-Col. G. A. Moore, C.M.G., to be temporary Colonel whilst employed as Assistant Director of Medical Services of a Division.

The undermentioned to retain the acting rank of Lieutenant-Colonel: Capt. T. S. Eves, whilst commanding a Field Ambulance; Major D. O. Hyde, D.S.O., whilst commanding a Casualty Clearing Station; Major B. B. Burke, D.S.O., whilst commanding a Stationary Hospital.

To be acting Lieutenant-Colonels whilst commanding a Field Ambulance: Capt. T. H. Scott, M.C., and Temp. Capt. F. F. Muecke, L. D. Shaw, R. H. Drake-Brockman.

Major William Riach, C.M.G., to be acting Lieutenant-Colonel whilst commanding a Casualty Clearing Station.

To be temporary Majors: C. Christie and Temp. Major W. H. Laughlin, C.A.M.C.

Capt. B. Biggar is seconded for service with the Egyptian Army.

To be temporary Captains: A. G. Leitch, T. S. G. Martin, R. S. Miller, A. R. J. Douglas, H. Hebblewhite (Major T.F.R.), T. J. Burton, F. A. Murray, H. J. Cooper, and temporary Lieutenants E. Baldwin, T. Davidson, J. H. Patterson, J. S. Dickson, W. T. Patterson, G. Collins, J. R. Briscoe, P. W. Brigstocke, H. W. Barber, H. E. Williams, P. R. Eakell, H. M. Wilson, H. R. Davies, H. N. Rankin, L. F. West, C. H. G. Philip, W. O. Roberts, H. P. Caithness, H. Gardner-Hill, W. H. Hart, H. A. Boyle, S. B. Bethell, C. A. L. Evans, A. C. MacKay, W. Corbet, J. H. Waterhouse, B. R. Dermer, J. B. Robertson, G. M. Vevers, G. O. Hampson, J. B. Stevenson, W. J. Dilling, K. T. Limbrey, L. R. Pickett, A. McCawley, D. J. Evans, J. A. Tippett, P. H. Young, E. B. Barnes, J. B. Rae, J. M. Ross, C. I. Hannigan, O. W. Gange, J. G. Leslie, C. D. Coyle, L. G. Reynolds, G. L. Pillans, W. L. Paterson, D. J. Bedford, A. F. Wilson-Gunn, W. H. Pearce, A. Trall, M. Moran, A. R. Mitchell, W. O. Welby, J. M. Stalker, D. Crellin, P. Black, L. F. Hirst, R. C. Hewitt, J. C. O'Farrell, E. G. Dingley, P. H. Wells, A. L. McMaster, W. M. Christie, W. G. G. Coulter, D. G. MacArthur.

To be temporary Lieutenants: H. E. Batten, H. Whalley, J. L. D. Lewis, G. T. Watson, D. Lynch, W. M. Oakden, W. J. Oliver, J. M. Dickson, C. G. Lees, J. G. Reidy, C. L. Levers, H. B. Emerson, R. M. Liddell, H. H. Moyle, J. C. Jones, F. B. Mathews, C. J. Marshall, R. S. Drew, D. F. Brown, W. Venis, H. N. Wright, R. J. Lytle, J. F. Allen, V. J. Bonavia, I. C. Edwards, C. P. Crouch, W. Grier, C. B. Richardson, V. M. Walsh, J. S. Byrne, W. T. Harris, J. F. Blackett, E. M. Brown, H. H. Bywater, H. Harrison, G. H. U. Corbett, P. M. Tolmie, F. Humphreys, C. A. R. Nitch, J. W. Shields, A. H. H. Barclay, P. W. L. Andrew, J. P. Grainger, J. N. Beatties, L. C. Rorke, S. H. Davison, J. P. Ryan, J. Holland, J. Good, A. G. Harvey, E. B. Owens, C. H. Bannerman, P. Quinn, N. B. Stuart, J. T. Titterton, A. B. Moffatt, P. L. Hope, A. R. H. Geyer, D. R. Acheson, R. Stewart, W. L. Nicholson, W. Butterley, M. P. O'Brien, J. Martin, R. C. Hutchinson, F. R. Smyth, P. Al'an.

W. B. Hayes, temporary honorary Lieutenant whilst employed with No. 8 British Red Cross (Baltic and Corn Exchange) Hospital.

Officers relinquishing their commissions: Temp. Hon. Capt. R. S. Bernard (Fleet Surgeon, B.N., retired), Temp. Capt. F. W. Bird, R. D. Rankin (Can. A.M.C.), W. S. Heron, H. W. Doll, W. T. James, S. B. Faulkner, E. L. Mansel, P. W. White, J. P. Fitzpatrick, H. A. Gillespie, J. T. Smeall, S. G. Tippett, H. W. Ward, M. M. Townsend.

To be temporary Lieutenants: J. B. Carmichael, G. Hart, C. E. Cameron, L. Page, E. M. Ashcroft, H. E. Allanson, N. A. Boswell, W. Hughes, J. E. Bromley, H. N. Ingram, J. H. Mullan, J. K. Garner, T. T. O'Callaghan, D. M. Hunt, J. Pennmann, E. C. E. Barnes, A. C. D. Newton, J. McHaffie, N. Garrard.

Temp. Hon. Capt. H. W. Carson, having ceased to be employed with No. 10 British Red Cross (Lady Murray's) Hospital, relinquishes his commission.

### SPECIAL RESERVE OF OFFICERS.

Capt. R. T. C. Robertson to be acting Lieutenant-Colonel whilst commanding a Field Ambulance.

Lieut. (on probation) T. Parr is confirmed in his rank.

To be Lieutenants: E. A. C. Langton, F. E. Leblanc, A. A. Pitch (from University of London Contingent, O.T.C.), R. Woodsdale, G. M. Herriott, A. A. Pritchard, and J. W. Gordon and J. A. Tolmie (from Edinburgh University Contingent, O.T.C.).

### TERRITORIAL FORCE.

To be acting Lieutenant-Colonels whilst commanding a Field Ambulance: Capt. H. K. Dawson, Major P. R. Ash, G. W. Miller, H. E. Corbin.

To be acting Lieutenant-Colonel while commanding a Casualty Clearing Station: Major R. Stirling.

Major (temp. Lieut.-Col.) T. Holt relinquishes his temporary rank on alteration in posting.

Capt. (acting Lieut.-Col.) F. Coleman relinquishes his acting rank on ceasing to command a Field Ambulance.

Capt. (temp. Major) A. Don relinquishes his temporary rank on alteration in posting.

Capt. (acting Lieut.-Col.) S. F. Linton relinquishes his acting rank on ceasing to command a Field Ambulance.

Capt. (temp. Major) A. Elliot to be Major.

Lieutenants to be Captains: J. Anderson, R. W. Nevin, L. A. Celestin, D. F. Torrens.

W. B. Evans, from Royal Highlanders (T.F.), to be Lieutenant.

Major B. H. Myddleton-Gaye relinquishes his commission on account of ill-health, and is granted permission to retain his rank and wear the prescribed uniform.

Lieut. C. E. Proctor resigns his commission.

Major R. J. R. C. Simons, Ret. List, R.A.M.C. (T.F.), is granted the honorary rank of Lieutenant-Colonel.

### VOLUNTEER FORCE.

Temp. Second Lieut. G. Cowen, Surrey Volunteer Regiment, 5th Battalion, and O. R. M. Wood, Suffolk Volunteer Regiment, 2nd Battalion, to be temporary Lieutenants and Medical Officers.

J. H. Rowe (late Lieutenant, R.A.M.C.), Yorkshire West Riding Volunteer Regiment, 21st Battalion, to be temporary Lieutenant.

## JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

Wounds of the knee-joint, though apparently trivial, may give rise to serious complications and present many anxious problems to the surgeon. From this point of view Temporary Colonel Andrew Fullerton, C.M.G., consulting surgeon to the British Expeditionary Force, contributes a useful and well-illustrated article on the surgical anatomy of the synovial membrane of the knee-joint to the February issue of the *Journal of the Royal Army Medical Corps*. Temporary Lieutenant H. D. Adrian continues his investigations on the electrical reaction of muscles before and after nerve injury. There is a further instalment of the inquiry by Lieutenant-Colonel C. M. Wenyon and Captain F. W. O'Connor into problems affecting the spread and incidence of intestinal protozoal infections of British troops and natives in Egypt, with special reference to the carrier question, and the treatment of amoebic dysentery; an account is given of three new human intestinal protozoa. In this connexion it may be mentioned that Lieutenant-Colonel Wenyon contributed to our columns in 1916 (vol. ii.), a valuable article on the common intestinal protozoa of man, while further notes on the subject, with illustrations, appear from his pen in the same volume. Among other papers of interest is one by Major Alfred J. Hull on the treatment of gunshot wounds by packing with salt sacs, and another by Major A. F. Hurst on Trench Fever: a Relapsing Fever among the British Troops in France and Salonica. Each of these papers was sent to both the *Journal of the Royal Army Medical Corps* and to THE LANCET for publication, the first appearing in our issue of May 27th, 1916, p. 1077, and the second on Oct. 14th, 1916, p. 671, though in the present instance Major Hull's paper is reinforced by notes of cases, clinical charts, and other illustrations. Many readers will welcome the reappearance of the contributions from Colonel R. H. Pirth under the title "Some Musings of an Idle Man."

## URBAN VITAL STATISTICS.

(Week ended March 10th, 1917.)

**English and Welsh Towns.**—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18,000,000 persons, the annual rate of mortality was equal to 17·1, against rates declining from 22·5 to 18·4 per 1000 in the three preceding weeks. In London, with a population exceeding 4,000,000 persons, the death-rate was 18·5, or 0·5 per 1000 above that recorded in the previous week; among the remaining towns the rates ranged from 7·7 in Edmonton, 8·8 in Dewsbury, and 9·5 in Walthamstow, to 25·6 in Dudley, 27·4 in Warrington, and 29·0 in Hastings. The principal epidemic diseases caused 340 deaths, which corresponded to an annual rate of 1·0 per 1000, and included 179 from measles, 55 from infantile diarrhoea, 48 from diphtheria, 44 from whooping-cough, 9 from scarlet fever, and 5 from enteric fever. The deaths from measles showed a further increase in the numbers in the six preceding weeks, and caused the highest annual rates of 1·8 in Bolton and in Oldham, 2·7 in Acton, 3·0 in Wigan, and 4·1 in Dudley. The 811 cases of scarlet fever and the 1472 cases of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 18 below and 6 in excess of the numbers at the end of the previous week. Of the 5692 deaths from all causes in the 96 towns, 168 resulted from violence. The causes of 51 of the total deaths were uncertified, of which 9 were registered in Liverpool and 6 each in Birmingham and Manchester, but only 2 in London.

**Scotch Towns.**—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death rate was equal to 16·7, against 19·6 and 17·9 per 1000 in the two preceding weeks. The 352 deaths in Glasgow corresponded to an annual rate of 16·4, against 18·5 per 1000 in London, and included 16 from whooping-cough, 7 from measles, 2 each from diphtheria and infantile diarrhoea, and 1 from scarlet fever. The 104 deaths in Edinburgh were equal to a rate of 16·3 per 1000, and included 5 from whooping-cough, 4 from measles, and 1 from diphtheria.

**Irish Towns.**—The 186 deaths registered in Dublin were equal to an annual rate of 24·3, or 1·2 per 1000 less than that recorded in the previous week, and included 17 from measles, 4 from infantile diarrhoea, 3 from whooping-cough, and 1 from enteric fever. The 184 deaths in Belfast corresponded to a rate of 24·4 per 1000, and included 7 from measles, 3 from enteric fever, 2 from infantile diarrhoea, and 1 from diphtheria.

**CORNWALL INSURANCE COMMITTEE AND UNREGISTERED DENTISTS.**—At the last meeting of the Cornwall Insurance Committee it was reported that the Sanatorium Committee had recommended that no action be taken in the matter of a letter sent by the secretary of the Panel Committee. This communication referred to the action of the committee in requiring medical men, under exceptional circumstances, to meet unregistered dentists, and pointed out that such action was entirely contrary to the rules of the General Medical Council. It was mentioned that the reason why the Sanatorium Committee had advised no action was because they had no intention of using the services of any unregistered dentists.

**THE LATE THOMAS KNOX, L.R.C.P. & S. Irel.**—The death occurred on March 2nd, at his residence, of Mr. Thomas Knox, who for the past 35 years has been medical officer of Lisnasken Dispensary District and Workhouse and Fever Hospital, county Fermanagh. He was also medical officer of health of Lisnasken Union and medical attendant of the Royal Irish Constabulary. Mr. Knox was educated at the medical school in Dublin attached to the Royal College of Surgeons in Ireland, and became a Licentiate of that body and of the Royal College of Physicians of Ireland in 1874. He was 66 years of age and was a deservedly successful and popular practitioner.

## Correspondence.

"Audi alteram partem."

## EARLIER POST-OPERATIVE RAYING OF BREAST CANCER.

*To the Editor of THE LANCET.*

SIR,—I am very glad to see the letter from Mr. J. J. Grace advocating the earlier post-operative raying of breast cancer. I have been keenly interested in this matter for many years, and as far back as the spring of 1911, in a paper read before the West London Medico-Chirurgical Society, I strongly advocated the administration of a massive dose of the X rays to the site of operation before the closure of the wound, as this seemed the only logical development along the lines then practised. No serious objection has been raised to this suggestion, and to a radiologist at least it is difficult to understand why surgeons have been so reluctant to adopt this more generally. Even yet there are a few who do not have their breast cases X rayed after operation and even advise against it. As Mr. Grace points out, the surgical technique of these operations has been so elaborated that it approaches perfection, yet local recurrence takes place with undesirable frequency. No amount of skill and care will enable any surgeon to be quite sure that he has removed every trace of malignancy from an operation area, but he will greatly increase the patient's chance of a permanent cure by calling in the aid of the radiologist promptly, and what is equally important, leaving him to do his part of the work in his own way. The radiologist knows and understands the tools he is working with, and may be trusted to do no more and no less than his experience has taught him.

Probably no class of work presents greater difficulties in obtaining reliable data. Many cases come too late to derive any permanent benefit, others, after being much benefited, cease attending for various reasons, and are difficult to trace; but an experience lasting as long as the subject itself, and running into many hundreds of cases, leaves me thoroughly convinced that in the X rays we have a power over malignant disease that is capable of exerting a profound influence on our results. This power is much greater than it was even a few years ago and is still increasing; so much is this the case that we now obtain results scarcely hoped for a few years ago. This was well demonstrated in a series of cases shown by Mr. O. L. Addison and myself at the January meeting of the West London Medico-Chirurgical Society, and I think it may be said that those present received a lesson on the usefulness of the X rays in malignant disease that was somewhat of a revelation. The details of one of the cases shown may be given.

The patient was a man of 42 with a large mass in the abdomen about the size of a coconut. At the operation Mr. Addison found this to be a lympho-sarcoma with deposits in the stomach and liver and closed the incision without attempting removal. As soon as the patient was able to be about he came for X ray treatment, placing himself unreservedly in my hands. The mass rapidly diminished in size, digestion and health improved concurrently, he put on weight, and at the time of the meeting, seven months after the operation, he had been back to his work for some weeks and feeling quite well. Nothing could be then felt in the abdomen. He still comes for treatment, though not so frequently as before, and remains well at the present time. It is not suggested that this case is cured, but the result is a striking one nevertheless.

The other cases were scarcely less remarkable and all showed in the most unmistakable manner that in the modern developments of X ray technique we have a weapon of high value in our war against the scourge of malignant disease.

Regarding the closer co-operation between the surgeon and the radiologist in dealing with this problem I entirely endorse the plea contained in Mr. Grace's letter; as my writings will prove, I have been advocating this ever since 1903, and while there have been many discouragements I still hope to live to see the day it becomes the established practice. The partnership is one that holds nothing but good for all concerned, and no surgeon who has his patient's, and incidentally his own, interests at heart can afford to neglect this important aid to a permanently successful result, and

personally see that it is carried out. In the absence of facilities for raying at the time of operation the treatment should be commenced within a day or two—as soon as the patient has recovered from the anaesthetic and shock of operation. It is not necessary to disturb the dressings or the patient, as efficient treatment can be given at the bedside with a portable apparatus. Time is a most important factor for success, and we cannot afford to lose a single day's unnecessary delay. In the succeeding months further series of applications are given at gradually increasing intervals, with a diminishing number of applications in each series, and where this is carried out consistently it is rare to meet with local recurrence. More often secondary deposits arise in the spine or elsewhere, which is evidence of the case coming too late for operation or too late in being referred for radiation—perhaps both.

There is hardly any stage of malignant disease in which the X rays cannot be of some value. Inoperable cases are relieved of pain, and some of them through shrinkage, and becoming more movable, actually become operable, so that the case takes on a new aspect. Also the influence of modern X ray methods on a stinking, fungating, cancerous ulcer is such as would scarcely be believed by anyone who had not seen it for himself. I have caused such a mass to dry up completely, so that the last months were made reasonably comfortable and free from this most revolting feature.—I am, Sir, yours faithfully,

REGINALD MORTON,

Medical Officer in Charge, X Ray Department, West London Hospital.

Harley-street, W., March 12th, 1917.

## THE FIRST SCHOOL FOR MOTHERS.

To the Editor of THE LANCET.

SIR,—In reference to Dr. E. Pritchard's letter in your issue of March 3rd it may be said at once that my claim should have been limited to the question of precedence between Winchester and St. Pancras. To any school founded before November, 1906, I offer my humble apologies, provided it has been conducted from the beginning on the lines of the French institutions to describe which the name "School for Mothers" was originally coined.

In Dr. W. J. Maloney's translation of Budin's "Nursling," published in 1907, the following references to *Consultations de Nourrissons* will be found. Professor Budin (p. 148) recalls how one of his pupils had "aptly" said "these consultations are really schools for mothers." In the same lecture he exhorts medical men, whether their lot be placed in town or village, to organise consultations for nurslings. Dr. H. de Rothschild called Professor Budin's consultation a school for mothers (p. xxii.). In his preface (p. vii.) Dr. Maloney has written:—

Every practitioner, ..... whether his sphere be large or small, can find a consultation for nurslings. There is nothing costly or complex in Professor Budin's methods. All that is necessary is an apparatus for sterilising milk, a balance, and the energy of a medical man.

Winchester, in November, 1906, provided the balance and the energy of a medical man to hold the consultations and raise the number of admissions to 102 and the attendances to 790 in the year 1908. The centre was therefore a consultation for nurslings and as such entitled to the description "School for Mothers," unless it can be shown that Dr. Maloney has misrepresented his teacher's views and methods, or that English methods and terminology were not in the first instance borrowed from France. There was no apparatus for sterilising milk, and if Winchester on that account is to be ruled out it will disappear in good company with St. Pancras. If not, then for the sake of historical accuracy Dr. Pritchard may safely amend his statement, "St. Pancras was not even the second," to read "St. Pancras was not even the third," since Winchester and Marylebone were both in the field at an earlier date.

Among the earlier centres of which I have first-hand knowledge the Finsbury Milk Depôt, provided by the Social Workers' Association, under the guidance and direction of Dr. (now Sir) George Newman, should be mentioned. The balance required by Dr. Maloney, sterilised or pasteurised milk controlled from its source at the farm, and infant consultations held by medical men, were provided at the depôt. It was not mentioned in my first letter because infants

fed on the breast alone did not attend. I now find that the same somewhat serious defect existed at many of the French centres which Professor Budin has nevertheless referred to as consultations. Keeping, therefore, to the historical derivation of the title, the Finsbury Depôt should undoubtedly be ranked as a School for Mothers with priority from the date of its establishment on Nov. 23rd, 1904. In the "pioneer" (a loose term loosely defined in Webster's Dictionary) and "propaganda" work which has never been claimed for Winchester, Finsbury is well known to have played a part of the first importance.—I am, Sir, yours faithfully,

J. E. SANDILANDS.

Campden Hill-gardens, W., March 6th, 1917.

## THE CLOSURE OF COLOTOMY OPENINGS.

To the Editor of THE LANCET.

SIR,—There is a simpler method of closing colotomy openings than either of those described by Mr. F. Lockhart-Mummery in your issue of March 10th.

The patient having been anaesthetised, a piece of sterilised oiled silk 10 inches square is laid over the gauze dressings covering the opening, and its inner vertical edge sutured to the skin of the abdomen, so as effectually to shut off the opening from the field of operation. The abdomen is then opened to the mesial side of the oiled silk by a vertical incision passing through the left rectus sheath. On inserting broad retractors, the posterior aspect of the anterior abdominal wall is well seen, together with the involved portion of the colon adherent to it. The proximal and distal limbs of this are divided between clamps, end-to-end anastomosis performed as described by Mr. Lockhart-Mummery in his second method, and the bowel dropped back into the abdomen. The involved portion of the colon thus cut off from the rest of the bowel is disposed of by the method of invagination. A stout silk ligature is placed around each stump and the clamps removed. For the first time during the operation the dressings are removed from the colotomy opening, and an assistant introduces through it the opened blades of a pile forceps and passes them into the proximal limb, guided by the surgeon; the latter invaginates the stump upon itself, pushing the ligatured end between the blades, which the assistant closes firmly. The assistant next introduces a second pair of forceps into the distal limb, and in like manner, aided by the surgeon, seizes its ligatured stump. He then withdraws the two pairs of forceps simultaneously from the colotomy opening, which has the effect of completely invaginating the involved portion of bowel and carrying it outside the abdomen. Viewed from inside by the surgeon, all there is to be seen is a dimple in the parietal peritoneum. The surgeon closes the abdominal wound without a drain, applies a dressing, flaps over the oiled silk, and while the assistant makes traction on the forceps, ligatures the base of the invaginated mass, which is then cut off. A separate dressing is applied and the oiled silk returned to its original position. The wound of operation heals by first intention, and the opening in the skin and abdominal wall where the colotomy was, by granulation.

The great advantages of this method are the rapidity with which it can be performed and the shutting out of the colotomy opening from the field of operation until the latter has been all but completed.

I am, Sir, yours faithfully,

PAUL BERNARD ROTH,

Late Specialist in Operative Surgery, Aldershot Command.

Harley-street, W., March 12th, 1917.

## THE DIET OF THE BRAIN-WORKER.

To the Editor of THE LANCET.

SIR,—In support of the suggestion made in the annotation under the above heading in your issue of this date, that a brain-worker should take a diet of energy value equivalent to that of moderate muscular work, it may be of interest to record the following evidence on the subject. The late Field-Marshal Sir Lintorn Simmons, than whom a more painstaking and accurate observer never held rank in the British army, informed me some years ago that while he was governor of Woolwich Academy he kept notes of the amount of animal food consumed by the cadets, and found, to his surprise, that while they were under examination they consumed considerably more butcher's meat than at any other time in the academic year. The fact is the more remarkable in that during that period they were precluded in the main from taking outdoor exercise and from indulging in games and

field sports. When discussing the subject later Sir James Paget told me that his observations and personal experience fully confirmed Sir Lintern Simmons's statement, adding that when on a holiday, spent largely in the air, he felt little or no need for animal food, but ate it with keen appetite when full work in London debarred him from outdoor exercise. All the information which I have been able to glean in my own sphere of work strengthens the conviction that mental concentration creates such an appetite for animal food as points to a physiological demand.

I am, Sir, yours faithfully,

Harley-street, W., March 10th, 1917. W. BEZLY THORNE.

### THE AGE LIMITS OF PREGNANCY.

To the Editor of THE LANCET.

SIR.—I wish to establish, if possible, as a fact whether there is or is not a case of "a woman aged 48 or over having a living or viable child," recorded on evidence other than the *mere ipsa dixit* of the woman as to her age. Might I enlist the assistance of your readers to enable me to settle the point by reporting to me any cases within their knowledge. I am, of course, aware that there are a good many reported on the evidence of the mere statement of the woman that she was 48 or older; but as the Registration of Births Act is now over 50 years old it should be possible to get the date of parturition and the date of the mother's birth both officially recorded, and it is cases of this nature I am anxious to obtain for a forthcoming edition of "Taylor's Medical Jurisprudence."

I am, Sir, yours faithfully,

138, Harley-street, W., March 1st, 1917. FRED. J. SMITH.

### THE INTRAVENOUS INJECTION OF QUININE.

To the Editor of THE LANCET.

SIR.—With reference to the annotation on the above subject in your issue of March 3rd we should like to draw the attention of your readers to the advantages of colloidal quinine. Exhibited as a 1 per cent. "solution" the latter is on the alkaline side of neutrality and the temporary upset of injecting an acid solution either intravenously or intramuscularly is avoided. Furthermore—and this has been supported by laboratory experiment on animal veins—absorption of the quinine by osmosis and other mechanical factors into the tissues is much slower than in the case of molecular quinine solutions. We think it probable that the quinine in any case when injected must reach the colloidal state, and the statement of Dr. G. Arellano and his colleagues which you publish is of interest with regard to this when they say:

"It has been observed at times, especially when time is lost in inserting the needle, that a kind of flocculent precipitate is formed similar to that of "aluvine" when injected intravenously; but, as in that case, experience has shown it to be perfectly safe, it being a sort of emulso-suspensoid."

The precipitate at first formed undoubtedly goes into colloidal solution, but in doing so there is always upset of complement (*in vitro*, complement is destroyed).

In the use of quinine internally as an antiseptic, recommended by Dr. Vincent J. Glover in the same issue, the delayed absorption and elimination and the consequent prolonged antiseptic action of colloidal quinine administered directly as such opens a field of considerable possibilities.

I am, Sir, yours faithfully,

J. F. WARD

(For Crookes' Colloids, Limited).

Elgin-crescent, W., March 6th, 1917.

**STANDARDISED TUBERCULINS.**—We have received from Messrs. Duncan, Flockhart, and Co., of Edinburgh, samples of tuberculin prepared by the Research Laboratory of the Royal College of Physicians of Edinburgh, under the personal direction of Professor J. Ritchie. These include old tuberculin (T.), human and bovine, new tuberculin (T.R.), and bacillary emulsion (B.E.), put up in sterilised glass capsules containing a definite quantity of the original material or of desiccated bacilli. For the convenience of hospitals and other public institutions undiluted tuberculins are also issued. The Research Committee may be congratulated on its enterprise.

## The War.

### THE CASUALTY LIST.

The following names of medical officers appear among the casualties announced since our last issue:—

#### Died.

Major S. D. Rowland, R.A.M.C., was educated at Berkhamsted and at Downing College, Cambridge, and was a student at St. Bartholomew's Hospital, London, qualifying in 1897. Joining the staff of the Lister Institute shortly afterwards, he later went to India to undertake work in connexion with the Plague Commission. On the outbreak of war he joined the R.A.M.C., and went to France in charge of No. 1 Mobile Laboratory. He died in France on March 6th.

Lieut.-Col. S. W. Hewetson, Canadian A.M.C., was a student at McGill University, and qualified in 1893.

Major H. Jones, Canadian Army Medical Corps.

#### Wounded.

Lieut. D. P. Thomas, R.A.M.C., attached Royal Field Artillery.

Capt. R. P. N. B. Bennett, M.C., R.A.M.C.

Lieut. D. N. Fraser, R.A.M.C.

Lieut. A. Y. Dabgoekar, I.M.S.

Capt. G. W. Rogers, R.A.M.C., attached Lancashire Fusiliers.

Capt. E. A. Sanbrook, Australian A.M.C.

### DEATHS AMONG THE SONS OF MEDICAL MEN.

The following son of a medical man must be added to our lists of those who have fallen during the war:—

Second Lieut. R. M. Ross, Worcestershire Regiment, youngest son of Dr. D. M. Ross, of Brighton.

### THE HONOURS LIST.

The following awards to medical officers are announced:—

#### Bar to Military Cross.

Temp. Capt. Allen Coulter Hancock, M.C., R.A.M.C.

For conspicuous good work in advanced dressing-stations, notably when he successfully conducted evacuation of wounded under heavy shell-fire and adverse circumstances. Again, when the O.C. was wounded, Captain Hancock took command, and by his initiative, personal courage, and devotion to duty was responsible for the able carrying out of wounded through a barrage of shell-fire for six days. He was then severely gassed, but persisted in attempting duty until physically incapable.

(The award of the Military Cross was recorded in THE LANCET of Dec. 16th, 1916, p. 1034.)

#### Military Cross.

Temp. Lieut. George Cleverdon Hartley, R.A.M.C., attached East Surrey Regiment.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in assisting to rescue a wounded man from the open under very heavy fire.

### FOREIGN DECORATIONS.

#### By the King of Serbia.

Order of St. Sava, Fifth Class.—Capt. R. P. Nash, R.A.M.C.

Order of St. Sava, Third Class.—Major H. St. M. Carter, D.S.O., R.A.M.C.

Distinguished Service Medal.—Temp. Capt. R. Heaton, R.A.M.C.

#### By the King of Montenegro.

Silver Medal for Bravery.—Temp. Capt. D. O. Riddell, D.S.O., R.A.M.C.

#### By the Sultan of Egypt.

Order of the Nile, Third Class.—Col. J. Fallon, A.M.S.

**DOCTORS AND NATIONAL ORGANISATION.**—At the monthly meeting of the Royal Faculty of Physicians and Surgeons of Glasgow held on March 5th the following resolution, moved by Dr. J. McGregor Robertson, and seconded by Dr. John Brown, was approved:—

That the Royal Faculty of Physicians and Surgeons of Glasgow approves of the principle of the organisation of the whole nation to secure the successful and rapid conclusion of the war, so that all fit persons shall be liable to be called on by the Government to render such service in naval, military, or civil departments as they may be deemed suitable for, due regard being paid to age, training, and circumstances: if and when this proposal is carried into actual practice by the Government the Royal Faculty will be prepared to render all possible assistance in the organisation of their own profession.

## OBITUARY OF THE WAR.

JOSEPH ELLIS MILNE, M.A., M.D., C.M. ABERD., D.S.O.,  
CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain J. E. Milne, who was killed in action in France on Feb. 22nd at the age of 48, was youngest son of Captain James Milne, a shipmaster, of Fraserburgh and Aberdeen. He was educated at Aberdeen Grammar School and

University, taking his M.A. degree in 1888 and his M.B., C.M. with honours in 1891. Setting up in practice in Aberdeen, he remained there until April, 1915, when he applied for a commission in the R.A.M.C. Within a few days of obtaining it he sailed for France with the Highland Casualty Clearing Station, becoming later medical officer to the King's Liverpool Regiment. He had his aid-post in the front trench, having made special request that no wounded man

should be removed from the place where he fell until he had seen him. And doubtless it was when thus engaged that Captain Milne received his own fatal injury.

Captain Milne was from his youth up a keen sportsman; in Aberdeen he was doctor to the Football Club; and in rest billets with his battalion he organised football teams. He was a shrewd observer of men, and never forgot a face he had once seen. Fearless himself, he was a strength to those he tended, whether in his exceptionally large practice at home or with the Irish lads at the front. In both spheres he leaves a blank. Captain Milne was unmarried.

THE LATE LIEUTENANT-COLONEL J. F. FLASHMAN,  
A.A.M.C.

Lieutenant-Colonel James Froude Flashman, whose death from pneumonia while on active service in France in his forty-seventh year we announced in an obituary notice last week, had for several years occupied the position of Government pathologist in the New South Wales Lunacy Department, lecturing on neurology at the University of Sydney. After leaving the Lunacy Department he practised in Sydney, where he held the appointments of honorary assistant physician and lecturer on clinical medicine at the Royal Prince Alfred Hospital and honorary physician to the South Sydney Hospital. At the outbreak of war he was Officer Commanding the University Scouts, and relinquished his command to join the Medical Corps for service abroad. Towards the end of last year he became a Member of the Royal College of Physicians of London. By his death Australia has lost a most promising member of the medical profession.

## WAR DISABLEMENT.

Following their last statement and recommendations on the physical treatment of disabled soldiers, the Section of Balneology of the Royal Society of Medicine has now reappointed a War Disablement Committee to advise in all medical matters connected with the treatment and re-education of disabled soldiers. A demonstration of measuring apparatus was given at a meeting of the section on March 8th. Dr. R. Fortescue Fox said that it was fortunate for France that a leading part in the direction of the treatment of disabled men was in the hands of two physiologists, Professor Camus and Professor Amar, whose methods were widely followed in the centres for treatment and training throughout France. Dr. Fox showed a variety of instruments in use at the Red Cross Clinic for the Physical Treatment of Disabled Officers, including protractors and arthrometers from the Grand Palais Hospital, as well as Professor Amar's cheirograph for measuring and recording the feeble pressure

of paralysed hands and his arthro-dynamometer. The exhibit also included goniometers and a torsion-meter for measuring supination and pronation, designed at the clinic. Dr. Sonntag, medical officer to the clinic, demonstrated an ergograph that he had designed for estimating and recording the power of muscular movements. All patients at the clinic are submitted to weekly measurements by one or more of these instruments. Dr. J. Campbell McClure communicated a paper by Mr. Roddie, who has charge of the manipulation baths at the clinic. The whole body may be treated by manipulation baths at about blood heat or single limbs at a much higher temperature (112° to 118° F.). The paper described the action and uses of such baths in increasing the mobility of muscles and joints and improving their nutrition.

## THE EMERGENCY SURGICAL AID CORPS.

At the annual general meeting of this corps, held at the house of the Royal Society of Medicine, Sir Rickman Godlee presided over a good attendance of members. The organisation now consists of three corps, a Metropolitan Police section with 108 members, a military section (Home Forces) with 62 members, and a naval section, which has been formed since the last general meeting, with 12 chief surgeons, 43 surgeons, and 13 anesthetists. Each section is equipped with an ample supply of all necessary surgical appliances packed in convenient boxes and has at its disposal, thanks to the Royal Automobile Club, a fleet of powerful motor-cars, while assistance is given by the General Omnibus Company and the Great Eastern Railway Company. The police section deals with any emergencies that may occur in the metropolis by reason of air raids or other risks to life in connexion with the war, the military section operates on the East Coast from Dover to the Wash, and the naval section is a reserve for assisting naval surgeons to deal with wounds brought into our ports at any point in the United Kingdom. In submitting the annual report Sir Rickman Godlee testified to the energy and labours of the executive committee, and stated that since the last meeting the rotas had been summoned 12 times, including the call to the scene of the explosion on Jan. 19th, when 103 members responded and 53 were sent to the scene of the disaster. The statement of income and expenditure showed that the receipts were £2349. 6d., and the disbursements £253 14s. 5d., and the chairman said that the executive committee would like to see the fund replenished and the deficit made good. Sir Arthur May, representing the Royal Navy, assured the corps of the great value which his department attached to it and the urgent need for its existence in case of necessity, although he hoped that necessity would never arise. Sir Thomas Gallwey, representing the Home Forces, said that but for the Emergency Corps he would not be able to state that the Home Forces were prepared for all contingencies, while Sir Edward Henry, representing the Metropolitan Police, in thanking the corps, said that it was very desirable that the public should know that air-raid relief-parties had been organised everywhere and that the co-operation of the emergency corps ensured that even a catastrophe greater in magnitude than any yet experienced could, in respect to the aid of injured persons, be well and promptly dealt with. Some discussion on questions of detail in connexion with emergency work having taken place, the executive committee consisting of Sir Rickman Godlee, chairman, Captain F. F. Burghard, R.A.M.C. (T.F.), Mr. A. H. Cheatle, Mr. Ernest Clarke, Mr. W. H. Clayton-Greene, Mr. E. M. Corner, Major W. McA. Eccles, R.A.M.C. (T.F.), Mr. G. J. Jenkins, Dr. H. M. McCrea, Mr. M. S. Mayou, Mr. J. W. Thomson Walker, Dr. Andrew Wylie, and Mr. J. Y. W. MacAlister, honorary secretary, were re-elected, the name of Mr. J. P. Lockhart-Mummery being added to the list.

THE HARVARD MEDICAL UNIT.—Dr. Hugh Cabot and Dr. George P. Shattuck, of Boston, U.S.A., with 14 doctors and 17 nurses, arrived in London last week *en route* to France to reinforce the Harvard University Unit which has charge of one of our general hospitals. The unit is under the command of Sir Alan Perry, who met the new detachment. Dr. Cabot and Dr. Shattuck have already served a term at the hospital. It was rightly felt in the United States that to brave the perils of submarines was a fine action, and the unit had an enthusiastic send-off at Boston.



**THE CONFERENCE SUMMONED BY MR. NEVILLE  
CHAMBERLAIN.**

The Conference summoned by Mr. Neville Chamberlain, the Director-General of National Service, to consider the organisation of the medical profession with a view to meeting the needs of the military and civil population in existing circumstances, was opened on March 14th. Sir Donald MacAlister, K.C.B., President of the General Medical Council, presided, and all the representatives summoned to the Conference were present—namely, Dr. T. Jenner Verrall, Mr. E. B. Turner, Dr. Buttar, Dr. Richmond, representing the Central Medical War Committee; Dr. Frederick Taylor and Sir Rickman Godlee, representing the Committee of Reference of the English Royal Colleges; and Dr. Norman Walker, Dr. J. C. McVail, and Dr. John Adams, representing the Scottish Medical Service Emergency Committee. The secretaries of these committees—namely, Dr. Cox and Mr. Bishop Harman, secretaries of the Central Medical War Committee, Mr. Hallett, secretary of the Committee of Reference, and Mr. T. H. Graham, secretary of the Scottish Medical Service Emergency Committee—were in attendance. The Conference was also attended by Sir William Babtie, V.C., representing the War Office; by Sir Arthur Newsholme and Mr. Stutchbury, representing the Local Government Board in England; and Sir Robert Morant and Mr. Smith Whitaker, representing the National Insurance Commission. The Conference did not conclude the important business brought before it and met again on March 15th. If the Conference should decide to advise the Director-General of National Service that compulsory powers must be obtained, there can, we think, be no doubt that legislation will be necessary. We believe that, from a preliminary survey of the position, the departments of the Government particularly interested have come to the conclusion that such legislation will be required.

**ACCOMMODATION FOR THE WOUNDED AT PORTSMOUTH.**—The Portsmouth board of guardians have prepared a scheme which will enable them to place 200 additional beds at the workhouse at the disposal of the war authorities. This will make about 600 beds which the board have provided for the wounded. They have also given consent for hospital tents to be put up in the grounds adjoining the present military blocks and for the erection of a shelter-hut on the roof of one of the wards. Any damage that may occur to the existing buildings is to be made good by the military authorities at the conclusion of hostilities.

**VOCATIONAL RE-EDUCATION OF THE BELGIAN WAR CRIPPLE.**—The Belgian Military Institute of Professional Re-education at Port-Villerz, near Vernon, combines facilities for medical treatment with a complete course of vocational re-education continued until the man is fully trained. Whilst in British institutions at the present time medical treatment rarely occupies more than an hour each day of the man's time, and his disabled part is re-educated for a small fraction only of the day, the training in the Belgian workshops ensures the movement of muscles and joints for several additional hours of the day. The cure of functional disability of limbs depends in large measure on the man's psychology, and the Belgian experience is that the interest of his work and the mental stimulus of seeing something made by his own efforts have appreciable value in his cure.

**THE LATE DR. PATRICK W. MAXWELL.**—The death occurred on Saturday, March 10th, at his residence in Dublin, of Dr. Patrick William Maxwell, one of the best-known ophthalmic surgeons in Ireland. He was only 61 years of age, but had been in unsatisfactory health for some time, and the death of his wife a year ago, and more recently that of his only son, who was killed in action, contributed to the sad end. Patrick Maxwell was a native of Glasgow and was educated at Edinburgh University, where he took the M.B. and M.C. degrees in 1880. After spending some time abroad he settled in Dublin, obtained the Fellowship of the Royal College of Surgeons in Ireland, and held various hospital appointments. He was aural and ophthalmic surgeon to Dr. Steevens' Hospital, Jervis Street Hospital, and to the Royal Victoria Eye and Ear Hospital, and surgeon-aurost in ordinary to the Lord Lieutenant during the vice-royalty of Lord Zetland. Of the three daughters who survive him one, Miss E. M. Maxwell, is a member of the medical profession, and is at present engaged in ophthalmic work at Malta.

## Parliamentary Intelligence.

### NOTES ON CURRENT TOPICS.

#### *Cocaine in Dentistry.*

The Committee appointed by the Home Secretary to inquire into the use of cocaine in dentistry has reported, and the report is signed by Sir CHARLES HOBBHOUSE and three of the four remaining members. The inquiry took its rise in certain opposition which developed to the terms of a regulation under the Defence of the Realm Act forbidding the sale of cocaine to, or its possession by, any except authorised persons. This interfered with the supply of the drug to unregistered dental practitioners, and pending the completion of inquiry, temporary relaxation of the regulation was granted to them in the form of permits. The Committee has now come to the following conclusions:

We are of opinion that while there is practically no evidence to show any prevalence of the cocaine habit amongst the people of this country, and only one case of the improper use of cocaine by unregistered dentists, yet, as a drug, it is so uncertain and so potentially dangerous in its uncertainty that some restriction should be placed on its possession and sale. Accordingly, we recommend: (a) That preparations of cocaine containing more than 1 per cent. of cocaine for use as local anaesthetics in connexion with dental work should be procurable only from registered chemists, or from persons or firms licensed for the purpose by the Home Secretary, and subject to the condition that such preparations should be used for dental purposes only. (b) That such preparations should only be procurable for use by registered dentists or members of a dental association, the conditions of membership of which have been approved by the Home Secretary. The above-mentioned classes will naturally be free to purchase all preparations not exceeding 1 per cent. strength. (c) That persons practising bona fide as unregistered dental practitioners, and who can so satisfy their local authority, should be entitled to apply for registration, for right to purchase preparations of cocaine containing not more than 1 per cent. of cocaine. Such authorisation to be granted by the county or borough council of the locality in which their business is situated, any refusal to register such persons being subjected to an appeal to the Home Secretary.

Professor W. M. BAYLISS is the member of the Committee who does not sign the report.

"The conclusion," he says in the course of a memorandum, "to which the evidence compels me to come is that, since the sale of cocaine is attended with serious risks to the community and is unnecessary in dentistry, there is no reason to interfere with the operation of Regulation 40 B of the Defence of the Realm Regulations, and I would venture to recommend that the permit which has been issued to unregistered dentists to obtain preparations of cocaine should not be continued for any further period of time."

#### *Criminal Law Amendment Bill.*

Further consideration has been given to the terms of Clause 2 of the Criminal Law Amendment Bill by a Grand Committee of the House of Commons. The clause prohibits sexual intercourse by a person suffering from venereal disease in a communicable form.

On Thursday, March 8th, Mr. GLYN-JONES moved an amendment so that the offence of soliciting or inviting by a person suffering from venereal disease should not extend to instances where the parties were husband and wife. Sir GEORGE CAVE, the Home Secretary, deprecated introducing an exception into the general language of the clause. The amendment was withdrawn.

Mr. RAWLINSON moved an amendment to the effect that a person suffering from the disease

Shall forthwith consult a duly qualified medical practitioner either at a hospital or otherwise, and shall take reasonable precautions to prevent the communication of such disease to other people.

He said that Lord Rhondda's Bill had now been introduced in the House of Lords, but it only provided that unqualified persons should not practise as regarded venereal disease. There was not a word in that Bill requiring infected people to consult a medical man. Therefore it would be well to deal with the matter in the Bill before them. People should be persuaded at once to consult a physician.

Mr. HAYES FISHER (Parliamentary Secretary to the Local Government Board), whilst hoping that the amendment would not be pressed, agreed that it was most desirable that a duly qualified medical man should be promptly consulted. That, indeed, was the whole policy of the Local Government Board, and arrangements were being made all over the country that proper treatment could be obtained gratuitously and secretly. That was being done on a purely voluntary basis. By this inducement it was hoped greatly to mitigate the disease. But the policy was one of inducement and not of punishment. If failure to consult a duly qualified medical practitioner was made a criminal offence, that would stifle the policy of the Local Government Board at once. It would be unwise to invoke too many penalties.

Sir W. COLLINS referred to the scope of Lord Rhondda's Bill and expressed disappointment at its limited character. He did not find in it any of the sanitary precautions with which it had been expected the Bill would deal. As to the amendment, he favoured education and not punishment.

After some discussion the amendment was rejected without a division.

It having been agreed that from Clause 2 there should be admitted Subsection 3, providing for the compulsory examination of persons convicted of certain offences, on Wednesday, March 14th, the Committee, acting on an amendment moved by Commander WEDGWOOD, omitted also Subsection 4, the force of which, it was admitted by the Home Secretary, had now disappeared. Sir WILLIAM COLLINS moved as an amendment to insert—

Every medical practitioner on becoming aware that any patient of his is suffering from venereal disease in a communicable form shall forthwith inform him thereof, and warn him against any action or neglect on his part which might render likely the communication of such disease to any other person.

The amendment had been put down on the assumption that Subsections 3 and 4 were to be kept in the Bill, and after some debate was withdrawn. A discussion took place on a proposal to insert in the clause a subsection securing the detention of a person convicted of an offence in the schedule to the Act, and certified to be suffering from venereal disease, until the disease may be no longer communicable. The Home Secretary opposed the suggestion, which was rejected. In Subsection 6 of Clause 2 the following definition of venereal disease was agreed upon: "Syphilis, gonorrhœa or soft chancre," necessary additions to the list, if any, to be made by statute.

#### HOUSE OF LORDS.

THURSDAY, MARCH 8TH.

##### *Venereal Disease Bill.*

Lord RHONDDA (President of the Local Government Board) moved the second reading of the Venereal Disease Bill, the purpose of which is to prevent the treatment of venereal disease otherwise than by duly qualified medical practitioners and to control the supply of remedies therefor. He said that it was hoped that the measure would very considerably reduce the ravages of venereal disease. He did not propose to emphasise in any detail the widespread character of the evil or the fell consequences of this terrible scourge on the health of the nation. At the same time he wished to guard himself against any suggestion that because of the unpleasant nature of the subject with which the Bill dealt it ought not to be discussed. On the contrary, he thought that the National Council for the Prevention of Venereal Disease were doing valuable work in trying to bring home to the people of this country the terrible consequences of this contagion. It was most important that all should be taught to shun any possibility of contagion just as they would shun deadly poison. The Bill was based mainly on the conclusions of the Royal Commission which reported last year, and the conclusions of that body must carry greater force than anything he could say on this subject. The Commission had not been able to arrive at exact figures, but the evidence led it to the conclusion that the number of persons affected with syphilis, acquired or congenital, could not fall below 10 per cent. of the population in large cities. Gonorrhœa must exceed that proportion. In connexion with the Royal Commission, all would be indebted to Lord Sydenham, the chairman, for the work he had done, and he would heartily welcome any assistance which he would be good enough to give in the passage of the Bill into law. If precise and definite figures regarding the disease existed they would not be a full measure of the very great evil. The reason why figures were not available was that there were a number of deaths arising from this cause which were not detected as such, or they were otherwise certified in order to avoid wounding the susceptibilities of relatives. Deaths due to general paralysis of the insane were mainly to be attributed to venereal disease. It was often a cause in locomotor ataxy and aneurysm of the aorta. Congenital debility in infants was often due to syphilis in the parents. It predisposed very largely to tuberculosis. In the case of cancer it often happened that the disease was started in an old sore. The evidence before the Royal Commission showed that it was the cause even of the death of children before their birth. It was estimated that a large percentage of sterility in women was due to gonorrhœa, and a common cause of the blindness in children was venereal disease of the parents. That amply proved the need for remedial measures.

##### *Urgency of Legislation.*

The urgency (Lord Rhondda proceeded) would be great at any time, but it was greater now when the nation was at war. History recorded this fact over several centuries that after every great war there was a great increase in the disease. The noble lord proceeded to quote from Sir Malcolm Morris to the effect that the great strides in medical knowledge during the last 10 years gave more hope and encouragement that something substantial could be done in mitigating the evil. He referred also to the discovery of salvarsan by Ehrlich. The disease could be brought under control, and might now be regarded as curable if treated in the early stages. The Local Government Board had been in communication with the county councils and county borough councils and had invited them to prepare

schemes of diagnosis and treatment in co-operation with hospitals and general practitioners. It had arranged for elaborate facilities for diagnosis, hospital treatment, treatment to all comers irrespective of residence, free and confidential, and for the free supply of drugs to general practitioners. The county councils were asked to provide 25 per cent. of the cost, and the Treasury had agreed to contribute 75 per cent. The present Bill was a corollary to the treatment in these centres already being arranged by the local authorities. *Prevention of Quack Treatment.*

The Bill was designed to prevent quack treatment of the disease. It prohibited treatment by unqualified persons, and also the sale or supply of any drug in this connexion except on the written prescription of a duly qualified practitioner. Clause 2 provided means for the Act being brought into operation in an area when the local authorities had provided for free diagnosis and free treatment. The Bill went rather beyond the actual recommendations made by the Royal Commission. The Commission did not actually recommend the suppression of unqualified persons, but it reported that the members had no hesitation in stating that the effects of unqualified practice were disastrous, and its continued existence was one of the principal causes in hindering the eradication of venereal diseases. He had had conversation with several members of the Commission, and he thought that they would have gone further in some of their recommendations to-day. The Commission had had regard to some practical difficulties, but some of these had been removed. He did not claim that the Bill was watertight, and it was possible that some of its provisions might be evaded by unscrupulous persons. On the other hand, it marked a very considerable advance and the moral effect should be great. Their lordships might wish to know how far the schemes of treatment and diagnosis had been carried out. Schemes prepared by county councils and borough councils had been submitted for districts covering in England and Wales a population of 23½ millions out of a total population of 36 millions. Of these, schemes covering a population of 16 millions had been provided. In half the country, therefore, there was provision for free diagnosis and treatment. The practical difficulties which the Commission had in mind had been removed.

##### *An Uncontroversial Measure.*

The Bill (Lord Rhondda hoped) would be regarded as an uncontroversial measure. No doubt it would press a little hardly on druggists and chemists, but he had every confidence in believing that the pharmaceutical body as a whole would offer practically no opposition to the measure. It would, no doubt, interfere to some extent with the livelihood of herbalists, but after hearing from a deputation what they had to say he saw no reason to change his view that he ought to stand firmly for having no exception made with regard to them. Their Lordships might consider the Bill rather a mild measure for so great an evil, and he apprehended that any criticism which they might make would be towards the omissions in the Bill rather than on what it contained. There was a considerable body of opinion in the country which favoured compulsory notification. He approached that point with a perfectly open mind. He gave it every possible unprejudiced consideration, and he came to the conclusion that the Bill was not closing the door to some modified form of compulsory notification later on. For the present Parliament should give a fair trial to the action which was being taken by the local authorities, and it would prejudice that fair trial if compulsory notification were introduced now. Compulsory notification might endanger the new scheme of treatment, as it would encourage persons to conceal the presence of the disease. He hoped that after the Bill passed through the House of Lords it would be sent by the House of Commons for consideration to the Grand Committee which was considering the Criminal Law Amendment Bill.

Lord SYDENHAM, as Chairman of the Royal Commission on Venereal Disease, welcomed the Bill. There was abundant evidence brought before the Commission to prove that the treatment of venereal diseases by quacks and by quack remedies had been disastrous in the extreme. It was vitally important that these diseases should be treated in the very earliest stages. The noble lord drew attention at some length to the evils arising from quack remedies and quack treatment. The Commission was impressed with the evils of unqualified practice, but it did not like at the time when it reported to recommend legislation for the suppression of quacks, feeling that that ought to come when free and ample treatment was made for all classes. The Bill was a considerable step in advance.

Lord GAINFORD, speaking from his experience as President of the Board of Education (an office which, as Mr. J. A. Pease, he held before his elevation to the peerage), referred to the tragic sufferings which many children endured as the result of venereal disease in their parents.

The Bill was read a second time. The Venereal Disease Bill passed through Committee on Tuesday, March 13th, without amendment or comment.

## HOUSE OF COMMONS.

WEDNESDAY, MARCH 7TH.

## Nurses' Registration.

Mr. MACCALLUM SCOTT asked the Parliamentary Secretary to the Local Government Board whether, before any Bill for the State Registration of Trained Nurses was introduced, an opportunity would be given to the organised societies of nurses in England, Scotland, and Ireland to make representations to the Government.—Mr. HAYES FISHER replied: Full consideration will be given to any representations made by organised societies of nurses before the Government introduces any Bill for the State registration of nurses.

Mr. DUNDAS WHITE: Will they be given an opportunity of presenting their views personally by deputation?—Mr. HAYES FISHER: I will consider that.

Mr. RENDALL: Is it the intention of the Government to introduce a Bill of this kind?—Mr. HAYES FISHER: That is a matter that is still undergoing consideration.

THURSDAY, MARCH 8TH.

## Treatment of Disabled Soldiers in Scotland.

Answering Mr. DUNCAN MILLAR, Mr. BARNES (Minister of Pensions) said: When I discussed the whole subject of the treatment and training of disabled soldiers at a conference of the Provosts of Scottish towns at Glasgow recently, it was arranged that the matter should be considered for Scotland as a whole by them. In the meantime various proposals had been made by local committees. Among these we may mention the provision of a hospital for cases of paralysis at Ralston House, near Glasgow, and the use of the Hairmires Colony, near Lanark, for tuberculous cases. In Edinburgh the Royal Colleges of Physicians and Surgeons have undertaken the medical examination of cases for the local committees, and a joint committee of the Colleges is now considering arrangements for the medical treatment of discharged men. I am taking steps to arrange a conference of local committees with the object of securing the acceptance of a scheme for the whole of Scotland.

MONDAY, MARCH 12TH.

## Free Treatment of Venereal Diseases.

In reply to Mr. ROWNTREE, Mr. HAYES FISHER, Parliamentary Secretary to the Local Government Board, wrote: Twenty local authorities in England have already provided facilities for the free treatment of venereal diseases in 28 hospitals. These facilities are also available for the treatment of persons residing in other areas. The Local Government Board has approved the schemes of 24 other authorities for the provision of free treatment, and the facilities afforded by these schemes will be available shortly. In addition, the Board has under consideration further schemes submitted by 44 local authorities. It is not yet possible to supply any statistics as to the number of persons who are applying for treatment at the hospitals where facilities are already available.

## Infant Mortality.

Answering Mr. W. THORNE, who asked for statistics as to infant mortality in certain borough areas, Mr. HAYES FISHER wrote: The figures are:

	Deaths of infants under 1 year per 1000 births.			Deaths of infants under 1 year per 1000 births.			
	1914	1915	1916	1914	1915	1916	
Battersea ...	94	113	84	Liverpool ...	140	133	116
Lambeth ...	104	106	89	Manchester ...	129	128	109
Woolwich ...	85	94	68	Newcastle-on-Tyne ...	137	134	122
Birmingham ...	122	118	103	St. Helens ...	139	128	108
Blackburn ...	116	146	119	Sheffield ...	132	133	109
Bradford ...	122	123	119				
Burnley ...	158	166	151				
Coventry ...	86	86	88	Mean rate in the 14 areas	126	125	109
Leeds ...	124	127	126				

TUESDAY, MARCH 13TH.

## Medical Classification of Attested Men.

Replying to Mr. MACCALLUM SCOTT, who asked whether any decision had yet been reached as to the new instructions with regard to attested men rejected on re-examination and as to the new form of medical classification certificate, Mr. MACPHERSON (Under Secretary for War) said: It is intended to modify the present instructions and to issue a new form of medical classification certificate, but the new form and instructions have not yet been issued.

## Medical News.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—An ordinary meeting of the Council was held on March 8th, Sir W. Watson Cheyne, the President, being in the chair. A report was read from Mr. H. C. Golding-Bird on the proceedings of the Central Midwives Board during the past year. The Council placed on record their high appreciation of Mr. Golding-Bird's services as the representative of the College on the Central Midwives Board, and directed that the grateful thanks of the Council be conveyed to him for the very efficient manner in which he has fulfilled the duties associated with that office during the last eight years. Mr. H. J. Waring was elected as the representative of the College on the General Medical Council in the vacancy occasioned by the retirement of Sir Henry Morris. The Council resolved that they should place on record their great appreciation of the services of Sir Henry Morris in acting as the representative of the College on the General Medical Council for 13 years. The President reported the delivery of the Hunterian Oration by Surgeon-General Sir George H. Makins, K.C.M.G., A.M.S. The best thanks of the Council were given to Sir George Makins for his oration, and he was requested to publish it. In response to a request from the secretary of the National Medical Union, it was resolved that the President should receive a deputation from that body to confer with him on the subject of the mobilisation of the medical profession. Licences to practise dentistry were conferred upon 11 candidates (including one woman), who have passed the necessary examinations and have complied with the by-laws. The following are the names and dental schools of the successful candidates:

Cyril Charles Becker, Guy's Hospital; Eric Bottomley, Leeds University; George Harold Danks, Guy's Hospital; Thomas John Davies, London Hospital; Francis Malcolm Timothy Flintan, Middlesex and Royal Dental Hospitals; Florence Goodman, University College Hospital; Clifford Morley John, Bristol University; Aubrey Thompson Madin, Birmingham University; David Errand Robinson, Guy's Hospital; Alfred Williams, Bristol University; and Robert Wolff, B.Sc. Cape Town, Middlesex and Royal Dental Hospitals.

UNIVERSITY OF BRISTOL.—At the Second Examination for the degrees of M.B., Ch.B., the following candidates were successful:—

Hilda Mary Brown, Sukhasagar Datta, Marjorie Smith Neville, and Thomas Henry Algernon Pinniger.

At the Third Examination for the Diploma in Dental Surgery William Holder Shipway was successful.

THE Wellcome Historical Medical Museum will be closed from April 1st to the 30th, inclusive, for cleaning.

Mr. Leslie Pearce Gould, M.A., M.Ch. Oxford, F.R.C.S. Eng., has been elected Radcliffe Travelling Fellow at Oxford for 1917-20. He is the son of Sir Alfred Pearce Gould.

THE honorary treasurer of Queen Mary's Convalescent Auxiliary Hospitals, Roehampton, has received £1000 from the Executive Committee of the Saskatchewan branch of the Canadian Red Cross Society for a year's maintenance of a ward in these hospitals.

ROYAL MICROSCOPICAL SOCIETY.—The next meeting of this society will be held on Wednesday, March 21st, at 8 P.M., when Mr. Kenneth Goadby will communicate "Bacteriology of War Wounds."

CHARITY ORGANISATION SOCIETY.—The third of a series of lectures on social subjects will be held at 34, Queen Anne's Gate, S.W., by invitation of Lady Glenconner, on Wednesday next, March 21st, at 3.30 P.M. Dr. F. N. K. Menzies, Principal Assistant Medical Officer to the London County Council, will give an address on the Prevention of Consumption.

THE LATE ROBERT ROXBURGH, M.B. EDIN., F.R.C.S. EDIN., J.P.—Dr. Robert Roxburgh, who died at his residence at Weston-super-Mare, on Feb. 16th, graduated as M.B. Edin. in 1876, taking the F.R.C.S. Edin. in 1880. He had practised in Weston for many years, and was honorary physician to the Weston-super-Mare Hospital and consulting physician to the Royal West of England Sanatorium. He was held in high esteem in Weston, and his efforts in promoting every good public and sanitary work in that town will be gratefully remembered by his numerous friends and patients.

MEDICAL WOMEN'S FEDERATION.—The first general meeting of the Medical Women's Federation will be held at the rooms of the Medical Society of London, 11, Chandos Street, Cavendish-square, W., on Friday next, March 23rd, at 3 P.M. At this meeting a statement will be made as to the

history, aims, and objects of the Federation, after which the following resolution will be discussed and then put to the meeting:—

That this meeting heartily approves of the Medical Women's Federation and pledges itself to support it by every means within its power.

The election of officers will follow. Dr. Jane Walker is acting as honorary secretary *pro tem.* to the Federation.

THE PROFESSORSHIP OF CHEMISTRY IN QUEEN'S UNIVERSITY, BELFAST.—The Chair of Chemistry in the Queen's University of Belfast has become vacant through the resignation, owing to declining health, of Dr. E. A. Letts, who has held the position since 1879.

## Appointments.

*Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

HIME, ALFRED ERNEST BARRATT, L.R.C.P., M.R.C.S., D.P.H., has been appointed Medical Officer to the Rhode Hill V.A.D. Hospital, Uplyme, Devon.

KIRKMAN, ALBERT HENRY BRAUMONT, F.R.C.S. Edin., M.R.C.S., L.R.C.P., Medical Officer and Public Vaccinator for the Axmouth District by the Axminster (Devon) Board of Guardians.

LISTER, T. D., M.D., B.S. Lond., Consultant for Chest Cases to the Prince of Wales's Hospital for Officers, Marylebone-road, W. (Great Central Hotel).

NEWLAND, F. C., Certifying Surgeon under the Factory and Workshop Acts for the Cleobury Mortimer District of the county of Salop.

PRIDHAM, W. F., M.R.C.S., L.R.C.P., L.S.A., Medical Officer of Health for Great Torrington (Devon).

RAMSDEN-WOOD, WILLIAM EDWARD, M.A., M.D. Cantab., F.R.C.S., M.R.C.P. Edin., Representative on the Devon Voluntary Association for the Care of the Mentally Defective.

BOY, D. W., M.B., B.C. Cantab., F.R.C.S. Eng., Physician to Out-patients at the General Lying-in Hospital, York-road, Lambeth, S.E. SQUIRE, J. E., F.R.C.P., and WHITE, W. H., F.R.C.P., Consulting Physicians to the Marylebone General Dispensary.

WEBB, C. H. S., M.B., B.S. Lond., Assistant Surgeon to the Middlesex Hospital.

WILLIAMS, SYDNEY RICE, M.B. Lond., L.R.C.P., M.R.C.S., Temporary Medical Officer of Health for the Ashburton (Devon) District Council.

## Vacancies.

*For further information regarding each vacancy reference should be made to the advertisement (see Index). When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.*

BIRKENHEAD UNION INFIRMARY.—Junior Female Resident Assistant Medical Officer. Salary at the rate of £300 per annum, with board, &c.

BIRMINGHAM GENERAL DISPENSARY.—Resident Medical Officer, unmarried. Salary £250 per annum, with apartments, &c.

BIRMINGHAM AND MIDLAND EYE HOSPITAL.—Female House Surgeon. Salary £200 per annum.

BOLTON UNION, FISHPOOL INSTITUTION, Farnworth, near Bolton.—Resident Assistant Medical Officer. Salary £383 5s. per annum, with rations, &c.

BRENTFORD ROYAL INFIRMARY.—House Physician and House Surgeon. Salary at rate of £120 per annum, with board, &c.

BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.

CAMBRIDGE, COUNTY MENTAL HOSPITAL.—First Assistant Medical Officer. Also Junior (Second) Assistant Medical Officer, unmarried. Salaries £300 and £200 respectively, with board, &c.

CARLISLE, CUMBERLAND INFIRMARY.—House Surgeon. Salary £200 per annum, with board, &c.

COLCHESTER, ESSEX COUNTY HOSPITAL.—Female House Surgeons.

DEVONPORT, ROYAL ALBERT HOSPITAL.—Assistant House Surgeon, unmarried. Salary £150 per annum, with board, &c.

EVELINA HOSPITAL FOR SICK CHILDREN, Southwark, S.E.—Clinical Assistants in Out-patient Departments.

GRIMSBY COUNTY BOROUGH.—Temporary Female Assistant Medical Officer. Salary £350 per annum.

GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon. Salary £250 per annum, with board, &c.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.—House Physician for six months. Salary 30 guineas.

IPSWICH, EAST SUFFOLK AND IPSWICH HOSPITAL.—Female Resident Officer.

KENSINGTON AND FULHAM GENERAL HOSPITAL, Earl's Court, S.W.—Resident Medical Officer. Salary £150 per annum.

KENT EDUCATION COMMITTEE.—Ophthalmic Surgeon.

LIVERPOOL, DAVID LEWIS NORTHERN HOSPITAL.—House Surgeon for six months. Salary at the rate of £150 per annum, with board, &c.

LIVERPOOL, ROYAL SOUTHERN HOSPITAL.—Two House Surgeons for six months.

LONDON THROAT HOSPITAL, 204, Great Portland-street, W.—House Surgeon. Salary £50 per annum.

MANCHESTER, BAGLEY SANATORIUM FOR TUBERCULOSIS.—First Assistant Medical Officer, unmarried. Salary £300 per annum, with board, &c.

MANCHESTER CORPORATION.—Assistant Tuberculosis Officer. Salary £250 per annum.

MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Park-place, Cheetham Hill-road.—House Surgeon. Salary £120 per annum, with board, &c.

METROPOLITAN HOSPITAL, Kingsland-road, E.—Temporary Medical Officer for the Tuberculosis Dispensary.

NORWICH, NORFOLK AND NORWICH HOSPITAL.—Two House Surgeons. Salary £400 per annum, with board, &c.

OLDHAM ROYAL INFIRMARY.—First House Surgeon. Salary £250 per annum. Also Second House Surgeon. Salary £250 per annum. Also Third House Surgeon. Salary £200 per annum. With board, &c.

PETERBOROUGH INFIRMARY.—House Surgeon. Salary £150 per annum for first six months, £200 after, with board, &c.

PLAISTOW FEVER HOSPITAL, E.—Female Resident Medical Officer. Salary at rate of £250 per annum, all found.

QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E.—House Surgeon and Casualty House Surgeon for six months. Salary £120 per annum, with board, &c.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford.—House Surgeon.

READING, ROYAL BERKSHIRE HOSPITAL.—House Surgeon for six months. Salary £250 per annum, with board, &c.

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.—Female Senior Obstetric Assistant. Salary £33 per annum, with board, &c. Also to attend at Endsleigh-street Maternity Hospital. Salary £60 per annum.

ROYAL WATERLOO HOSPITAL FOR CHILDREN AND WOMEN, S.E.—Temporary Honorary Assistant Physician.

SALFORD ROYAL HOSPITAL.—Junior House Surgeon. Salary at rate of £150 per annum, with board, &c.

SHEFFIELD ROYAL INFIRMARY.—House Physician. Salary £120 per annum, with board, &c.

SHERESBURY, SHIRLETT SANATORIUM.—Temporary Assistant Officer.

Salary £300 per annum, with board, &c.

SOUTHAMPTON, ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL.—House Physician and Junior House Surgeon. Salaries £150 and £120 per annum respectively, with board, &c.

TRURO, ROYAL CORNWALL INFIRMARY.—House Surgeon. Salary £150 per annum, with board, &c.

WARRINGTON INFIRMARY AND DISPENSARY.—Senior and Junior House Surgeons. Salary £200 and £150 per annum respectively, with board, &c.

WILTSHIRE COUNTY COUNCIL GENERAL EDUCATION COMMITTEE.—Dental Surgeon. Salary £250 per annum.

WINCHESTER, ROYAL HAMPSHIRE COUNTY HOSPITAL.—Resident Medical Officer. Salary £300 per annum, with board, &c.

WOLVERHAMPTON AND STAFFORDSHIRE GENERAL HOSPITAL.—Resident Medical Officer or House Surgeon. Salary at rate of £150 per annum, with board, &c.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Glynneath (Glamorgan); and at Gravesend (Kent).

## Births, Marriages, and Deaths.

### BIRTHS.

DOWNS.—On March 12th, at Palmers, Marlow-on-Thames, the wife of Dr. G. E. Downs, of a son.

EVANS.—On March 7th, Dorothy, wife of Arthur Evans, M.S., F.R.C.S., of Devonshire-place, W., of a son.

TATTERSALL.—On March 8th, at Beachy, Neath, South Wales, to Marnie and Captain Norman Tattersall, R.A.M.C.—a son.

WHELDON.—On March 3rd, at Abbeville-road, Clapham Park, S.W., to the wife of George Wheldon, L.D.S., Temporary Lieutenant, R.A.M.C.—a son.

### MARRIAGES.

BROOME—HARVEY.—On March 6th, at Bradling Parish Church, I.W., Frederick Charles Sedgwick Broome, Surgeon, R.N., to Mona Kathleen, youngest daughter of Mr. and Mrs. John Ginnes Harvey, Bradling.

CARTE—FOSTER.—On March 8th, at Holy Trinity Church, Cambridge, Geoffrey W. Carte, Surgeon, R.N., to Georgina, daughter of Captain Michael Foster, M.D., F.R.C.P.

FARNFIELD—WINDSOR-WATSON.—On March 7th, at All Souls', Hastings, John Stewart Farnfield, M.R.C.S., L.R.C.P. Lond., to Annabel Windsor-Watson, widow of John Watson, solicitor, Liverpool.

LEWIS—MANSFIELD.—On March 3rd, at St. Saviour's Church, London, Lieutenant-Colonel Rowland Philip Lewis, R.A.M.C., Wales, to Muriel Mary, only daughter of the late Edmund C. Mansfield, Ardrammon House, co. Donegal.

STRATON—ROBERTSON.—On March 7th, at St. Matthew's Church, Ealing, Arthur Arbutnot Stratton, M.D., F.R.C.S., Temp. Captain, R.A.M.C., to Mabel, third daughter of Mr. and Mrs. James Robertson, of Warwick-road, Ealing.

### DEATHS.

BEATLEY.—At St. Mary's terrace, Newcastle-on-Tyne, William Cramp Beatley, M.D., in his 61st year.

INMAN.—On March 11th, at Bournemouth, of heart failure, resulting from an acute pneumococcal infection, Dorothy Marguerite, beloved wife of A. C. Inman, M.A., M.B. Oxon, Superintendent of Laboratories, Brompton Hospital, London, Temp. Hon. Capt. R.A.M.C., and only child of Dr. and Mrs. Wethored, of 83, Harley-street, London.

MURDOCH.—On March 9th, at Fruids Park, Annan, Dumfriesshire, William Murdoch, M.D. Edin., aged 62 years.

RAWES.—On March 6th, at a nursing home in London, William Rawes, F.R.C.S. Eng., M.D. Durh., of St. Luke's Hospital, City-road, aged 55 years.

N.B.—A fee of 6s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

## Notes, Short Comments, and Answers to Correspondents.

### ICELAND MOSS.

A GERMAN professor has recently suggested using Iceland moss for mixing with flour to make bread. The following account of the use of this substance will be found in "A History of the Vegetable Kingdom" (1857), by William Rhind, then lecturer on botany, Marischal College, Aberdeen:—

Iceland moss (*Lichen islandicus*) is used as an edible substance by the Icelanders, who rarely obtain corn bread, and whose limited stock of substitutes obliges them to have recourse to every species of vegetable production, which is permitted by their inclement climate to spring forth. The plant is collected by the inhabitants of this northern region; and after being washed, is either cut into pieces, or it is dried by the fire or in the sun, then put into a bag which is well beaten. It is ultimately worked into a powder by being trampled on, and in this state is used as food. This lichen is found growing on the mountains both in the lowlands and highlands of Scotland. It consists of upright leaves nearly 2 inches high; soft and pliant when moist, but rigid when dry. They are smooth and shining, inclining to a red colour towards the roots, and having the exterior surface sprinkled with very minute black warts. The margins are set with small short stiff sporules. This lichen contains a nutritious matter called lichen-starch, along with a bitter principle. It is demulcent and tonic. When boiled and macerated in water it forms a nutritious and light jelly, which, with the addition of sugar and milk, has been used as a dietetic medicine in cases of decline, and was fancied at one time as a cure for consumption.

The name is now *Cetraria islandica*. In Germany it is said to be used for dressing the warp of webs in the loom. The jelly has also been mixed with wine as a nutrient drink. The moss is now said to contain cetrarin 3 per cent., lichenin 45 per cent., amyloaceous fibrin 36 per cent., gum 4 per cent., non-crystallisable sugar 4 per cent., water and salts (inorganic) 8 per cent. Lichenin is a starch-like body. The component parts, according to the analysis of Berzelius, are as follows: Bitter extractive 3·0, lichen-starch 44·6, sugar 3·6, gum 3·7, yellow extractive 7·0, green wax 1·6, tartar, tartrate of lime, and a little phosphate of lime 1·9, starchy fibre 36·2, trace of gallic acid. Dr. Spencer Thomson in 1852 said that—

It has been estimated that a ton of Iceland moss contains about as much nutritive matter as half a ton of wheat. The Saxon Government published a report upon this subject a few years ago, in which we are informed that 6 pounds 11 ounces of lichen meal, boiled with 14 times its quantity of water, and baked in this state with 39½ pounds of flour, produced 111½ pounds of good household bread. Without this addition the flour would not have produced more than 78½ pounds of bread, consequently the addition of 6 pounds 11 ounces of lichen meal occasioned an increase of above 32 pounds of good bread.

This increase was owing, of course, to additional water.

The use of the moss in phthisis was first established in Vienna and then admitted into the *materia medica* of the Edinburgh Pharmacopœia. London, however, did not much credit its virtues as a medicine. 1½ ounces of the lichen were boiled in a quart of milk not longer than a quarter of an hour over a slow fire. A teacupful was directed to be drunk frequently in the course of the day.

A German description runs as follows:—

After the bitter taste, which is found in the outer layer of the thallus, is got rid of by means of washing in weak potash solution, the result is the sweet Iceland moss (*Lichen islandicus ab amarisita liberatus*).

In Germany it is plentiful in the Fichtelgebirge, a mountain system of north-east Bavaria and in the Harz mountains and Tyrol. The composition is described as Flechtenstärke (Lichenin) and Flechtenbitter (Cetrarin).

### LETTERS FOR THE LONDON POSTAL AREA: NEW METHOD OF ADDRESS.

THE Postmaster-General has issued an appeal to the public in London and to their correspondents in the provinces to "adopt a simple system which will improve the postal service at the cost of very little trouble to themselves," thereby helping to save labour and money, which the country requires for war services. Under the system referred to the 112 separate delivery offices in London are each assigned a number to be added to the particular district in which they are situated. This, it is claimed, will materially assist the present staff of inexperienced Post Office sorters to relegate correspondence to its proper destination. The public are invited to observe the following method of addressing letters, parcels, and other postal packets for any house in the London postal area: 1. Name of addressee. 2. Number (or, if there is no number, the name) of the house. If there is a number as well as a name, the number should always be used. 3. Name of street or road in which the house is situated. 4. Initials of the postal district, followed by the number of the office of delivery. 5. The word "London"

if the place of posting is outside the London area. It will be immaterial, the Postmaster-General says, whether the name of the sub-district—e.g., Hampstead, Blackheath, Kensington—is inserted, omitted, or wrongly stated, as these will be ignored. We suggest that any omission to the fullest possible address may lead to confusion, how widespread we do not pretend to know. In the "Official List of Principal Streets," which can be obtained gratis at any post office, we find Queen-street, Mayfair, and Queen-street, Edgware-road, are both in the same delivery office, W. 1; and Prince's-road, South Wimbledon, and Prince's-road, Wimbledon Park, are both in delivery office S.W. 19. Under the new arrangement the address of THE LANCET Office is 423, Strand, W.C. 2, with the addition of the word "London" for correspondence from the provinces.

### BOVRIL PICTURES: "THE DUEL."

In connexion with their "Picture Scheme" Messrs. Bovril, Limited, of Old-street, London, have sent us a handsome framed engraving, size 40 × 30 in., after a picture by Mr. Cadogan Cowper, A.R.A., and signed by the artist. The picture, which has been excellently reproduced on India paper by Messrs. C. W. Faulkner and Co., represents a pair of duelists engaged in a resolute bout, apparently for the favour of a lady who stands in the foreground with a look of dismay depicted on her countenance. The subject of the picture is the outcome of the dream of a well-known Member of Parliament, when sleeping in the room in which, it was afterwards discovered, such an encounter as is depicted actually took place. This is the expected sequence of events when one dreams in panelled chambers, and Mr. Cowper has rendered the carved oak panelling over the old-fashioned fireplace with great dexterity as a background to his vigorous fighters. Altogether the engraving is well up to the standard of its predecessors in this series, and that standard is a high one.

### PREMIUMS OF OLD-TIME MEDICAL APPRENTICES.

APPRENTICESHIP in the medical profession is a thing of the past. There are no indentures now, though some medical men are still alive who were once apprentices serving under a master after indentures had been signed. At the Royal College of Surgeons of England there are three apprenticeship books kept, one recording the payment of the orphan's tax of half-a-crown and the other two (1745-1846) containing lists of apprentices and masters. The last entry in these books is dated April 24th, 1846, and records the fact that George Tertius Talbot had paid Mr. Joseph Henry Green, of Lincoln's Inn-fields, the sum of £315 as an apprentice who was "not to board." Joseph Henry Green was President of the Royal College of Surgeons of England in 1849 and 1858, and a very important person in the medical world, so that he could demand a stiff fee for indentures, but some of the premiums paid previously to that date were very high. The record was reached in January, 1826, when the sum of £1050 was paid to Frederick Tyrrell on behalf of or by William Tice James. Again, in 1830 £1050 was paid by or for James Dixon to the same eminent surgeon. On Dec. 2nd, 1825, John Alexander Harper's premium to Aston Key is £1000. £800 was paid for Thomas Egerton to William Money, and for William Pennington to Edward Stanley, of Lincoln's Inn-fields, £700, both in 1822. The last is a frequently occurring sum, as is also £600. But the regulation fee paid to a great surgeon on the staff of a hospital by a student anxious for a corner of his mantle, or something more than crumbs from his table, appears to have been 500 guineas. Such a sum we find repeatedly paid to Green, Abernethy, Earle, Stanley, and other College Presidents. A frequent sum, where lesser men are the masters, was £199 10s., but the sums ranged very widely. As a rule, sons were indentured to their fathers for the nominal sum of 5s., or no fee was paid. A certain James Saner, of Finsbury-square, several times received 5s. Others—famous surgeons—took varying premiums. Thus Bransby Blake Cooper took John Henry Roberts for 5s. in 1829, the year after the famous case of Cooper versus Wakley, when Cooper's reputation as a surgeon may have been damaged. Immediately afterwards, however, Cooper's fee rose to £500 received from one John Clement, and continued high as far as the record runs. Samuel Solly was taken by Benjamin Travers for 500 guineas, but Solly himself in 1834 charged £630 to an apprentice.

In the eighteenth century fees were smaller. They did not rise above £400, till in 1770 (May 3rd) £725 was paid by Charles Griffith to William Sharp. Henry Cline and William Blizzard were paid premiums of £300 in 1783, but Blizzard, who was President of the College in 1822, charged £500 in 1787. James Earle charged £315 in 1794, and the pupil "finds board, &c." On Nov. 4th, 1784, £500 was paid for Astley Cooper to William Cooper, but Sir Astley Cooper took no premium from Edward Cock in 1822, nor from Bransby Blake Cooper just 100 years ago. These were members of his family, and the famous Sir Astley Cooper was attacked

in an early issue of THE LANCET for nepotism. His conduct was defended by Sir James Scarlett in the case of Bransby Cooper v. Wakley on the obvious ground that a man was more likely to trust members of his own family than outsiders.

## THE PRICE OF FISH.

An article which appeared recently in the *Daily Mail* advocated as a form of National Service the institution of volunteers for fishing. The suggestion is interesting. The numbers of boats and men available now for the "harvest of the sea" are doubtless known to those most concerned, and a proposal of this kind would naturally be dependent upon factors familiar to the authorities. That there was a harvest may be seen by recalling that at the end of the season 12 years ago the catch of herrings officially stated at Yarmouth alone amounted to 535,378,800 herrings, 700 boats being engaged, and after curing them in the Scotch method, Yarmouth sent to Germany and Russia 239,496 barrels; and Lowestoft, a few miles away, sent to the same places 102,460 barrels, a grand total of 341,956 barrels. On this occasion the "Scotch lassies" came down from the North to pack them.

Much information that is of highly practical importance to-day will be found in a book published in 1908 on "The Romance of the World's Fisheries," by Sidney Wright (Seeley and Co., Ltd., London). With reference to mussels, the author says:

But why "go after" mussels when so many millions of them are to be picked from rocks, breakwaters, and mud or shingle-banks? The question is reasonable enough, though it would never be asked by anyone who had the least idea as to the number of mussels that are used in the United Kingdom alone every year. Hundreds of thousands, not of mussels, but of tons of mussels, are gathered annually and sold; and, absurd as it may sound, there is little difference between the profits made on them and those derived from the oyster fishery. To France alone the Belgians export over twelve million francs' (half a million pounds') worth every year. Then who are the consumers? The ground, in the first place; all the small mussels, and those which may have been tainted with sewage or poisoned by the copper bottoms of ships, are sent away by the barge-load for manure, or for lightening heavy clay soil. Secondly, the poor. Apart from those mussels that are eaten from choice, or those which the fisher-people out of work are sometimes glad to make a dinner of, many tons of them are eaten by the London poor alone every winter; buying them at a penny a quart, a family can have a meal for twopence. Even then we have not accounted for a third of the numbers given above. The prime mussels are required as bait for fine-fishing, and are sold at the rate of rather less than £2 a ton (over 51,000 fish go to the ton). Many fishing boats' crews use over 4 tons per boat in a month in this manner.

Referring to whelks, he states that these fish are a favourite food among the fisher people, and from the fact that a man will often do a hard day's work on nothing else they must needs be nourishing. The proportionate cost and nutriment of these small shell-fish have recently been debated in the press.

## VITAL STATISTICS OF BRITISH HONDURAS.

The Colonial Office has issued a report on the Blue-book of British Honduras for the year 1915. It gives the estimated mean population for the year as 41,928—21,041 males and 20,887 females. The death-rate was 26·2 per 1000 of population, compared with 28·1 in 1914. As usual, the principal cause of death was malarial fever. The birth-rate was 40·092 per 1000. The number of illegitimate births was 695 out of a total of 1681, or 41·35 per cent. The daily average number of patients under treatment and care in Belize Hospital was 40·73, in Corozal Hospital 4·96, in Orange Walk Hospital 4·85, in Stann Creek Hospital 8·2, in Punta Gorda Hospital 9·10, in Belize Lunatic Asylum 70·31, and in the poorhouse 35·82. The average rainfall for the ten years 1906-1915 in Belize was 85·16 inches, the maximum (130·93 inches) being in 1911 and the minimum (63·76 inches) in 1910. The average number of days on which rain fell during the ten years was 127.

P.N.—The term "Bipp" was given by Professor Rutherford Morison to Bismuth subnitrate, Iodoform, and Paraffin Paste, the use of which in the treatment of wounds was described in THE LANCET of August 12th, 1916, p. 268. A paper by Dr. Louise Garrett Anderson and Dr. Helen Chambers was published in THE LANCET of March 3rd, 1917, giving an account of this treatment at the Military Hospital, Endell-street, W.C., with a note on the bacteriological and chemical qualities of the paste by Dr. Chambers and Mr. J. N. Goldsmith.

Dr. M. L. (Paris).—An article on the subject appeared in THE LANCET of May 7th, 1910, entitled "The Use of Solid Carbon Dioxide," by Edward Reginald Morton, M.D., F.R.C.S. A book on the subject was reviewed in THE LANCET of Feb. 14th, 1914, entitled "Carbon Dioxide Snow," by J. Hall-Edwards, L.R.C.P. Edin., F.R.S. Edin. (London: Simpkin, Marshall, Hamilton, Kent, and Co. Pp. 78. Price 3s. 6d.). Aerators, Limited, Upper Edmonton, London N., some years ago issued an illustrated explanatory pamphlet entitled "Prana" Carbon Dioxide Snow Apparatus."

## Medical Diary for the ensuing Week.

## SOCIETIES.

ROYAL SOCIETY, Burlington House, London, W.

TUESDAY.—Paper:—Dr. J. C. Mottram and Dr. S. Russ: Observations and Experiments on the Susceptibility and Immunity of Rats towards Jensen's Rat Sarcoma (communicated by Prof. H. G. Plummer).

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

Tuesday, March 20th.

GENERAL MEETING OF FELLOWS, at 5 P.M.  
Ballot for Election to the Fellowship.

## MEETINGS OF SECTIONS.

Thursday, March 22nd.

NEUROLOGY (Hon. Secretaries—H. Campbell Thomson, C. M. Hinds Howell): at 8 P.M.  
A CLINICAL MEETING will be held at the National Hospital, Queen-square, Bloomsbury.

Friday, March 23rd.

STUDY OF DISEASE IN CHILDREN (Hon. Secretaries—A. S. Blundell Bankart, H. A. Cockayne, C. P. Lapage): at 4.30 P.M.  
Cases:

Dr. H. C. Cameron: Amyotonia Congenita.

Dr. E. Caughey: Splenic Enlargement.

Papers:

Dr. H. C. Cameron: Status Lymphaticus from the Clinical Stand-point.

Major Hunter, C.A.M.S.: A Remarkable Condition of Development occurring in Two Brothers.

MEDICAL SOCIETY OF LONDON, 11, Chandos-st., Cavendish sq., W.

MONDAY, THURSDAY AND FRIDAY.—8.30 P.M., Lettsomian Lectures:—

Col. C. Wallace, A.M.S., C.B.: War Surgery of the Abdomen.

LONDON DERMATOLOGICAL SOCIETY, St. John's Hospital, 49, Leicester-square, W.C.

TUESDAY.—6 P.M., Paper:—Capt. A. Innes, R.A.M.C. (T.): Pomphigus Acutus in the Anglo-Egyptian Sudan.

ROYAL STATISTICAL SOCIETY, Rooms of the Royal Society of Arts, John-street, Adelphi, W.C.

TUESDAY.—5.15 P.M., Paper:—The Right Hon. the Earl of Dunraven, K.P., C.M.G.: How to Improve our Fishing Industries.

ROYAL MICROSCOPICAL SOCIETY, 20, Hanover-square, W.

WEDNESDAY.—8 P.M., Mr. K. Guadby: Bacteriology of War Wounds.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East.

TUESDAY.—5 P.M., Lumleian Lectures:—Dr. G. A. Sutherland: Modern Aspects of Heart Disease. (Lecture III.)

THURSDAY.—5 P.M., Goultstonian Lectures:—Dr. C. H. Miller: Parathyroid Infections. (Lecture I.)

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simson: Gynaecological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

ROYAL INSTITUTE OF PUBLIC HEALTH, Lecture Hall of the Institute, 37, Russell-square, W.C.

Courses of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—

WEDNESDAY.—4 P.M., Lecture X:—Prof. Sir Thomas Oliver; The Hygiene in Operation in War Time. Mrs. B. S. Chesser, M.B., Miss R. E. Squire, Miss A. M. Anderson, and Mr. G. H. Roberts have promised to take part in the discussion.

## EDITORIAL NOTICES.

It is most important that communications relating to the Editorial business of THE LANCET should be addressed exclusively "TO THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.

We cannot undertake to return MSS. not used.  
Offices: 423, STRAND, LONDON, W.C. 2.

## MANAGER'S NOTICES.

## ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the new year, the price was raised to 8d. The rates of subscription remain as revised in October.

## TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C. 2, are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and not to THE LANCET Offices.

Subscribers abroad are particularly requested to note the rates of subscriptions given on page 4.

## METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, March 14th, 1917.

Date.	Rain-fall.	Solar Radio in Vacuum.	Maximum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
Mar. 8	...	63	35	25	Fzn.	26	Fine
" 9	...	62	39	26	32	31	Overcast
" 10	0.03	56	47	31	37	37	Overcast
" 11	0.05	56	51	37	46	47	Overcast
" 12	0.42	49	44	43	43	43	Raining
" 13	0.03	64	48	35	37	37	Overcast
" 14	0.14	76	47	37	43	44	Raining

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

The following journals, magazines, &c. have been received:—Quarterly Journal of Microscopical Science, Malattie del Cuore, Nordiskt Medicinskt Arkiv, Midland Medical Journal, Medical Review, American Journal of Public Health, Therapeutic Gazette, Revue de Chirurgie, Journal of Nervous and Mental Disease, Archives of Internal Medicine, &c.

## Communications, Letters, &amp;c., have been received from—

- A.—Messrs. Adlard and Son, and West and Newman, Lond.; Messrs. Allen and Hanbury, Lond.; Messrs. Armour and Co., Lond.; Capt. J. E. Adams, R.A.M.C.T.; Dr. Marion B. Andrews, Belfast; Messrs. Arnold and Sons, Lond.; Association of Science, Lond.; Sec. of: Arnhemsche Import Co., Arnhem.
- B.—Mr. W. Bryce, Edinburgh; British Organotherapy Co., Lond.; Mr. A. G. Berry, Lond.; Messrs. W. H. Bailey and Son, Lond.; Bolton Guardians, Clerk to the; Mr. J. F. Briscoe, Southampton; Messrs. Burroughs Wellcome and Co., Lond.; Bury and District Joint Hospital Board, Clerk to the; Surg. S. L. Baker, R.N.; British Burns Motor Lorries, Lond.; General Manager of: Birkenhead Guardians, Clerk to the; Mr. P. J. Byrne, Clonmel; Mr. J. L. Boone, Nashville, Tennessee; Mr. J. A. Byrne, Woodford; Dr. W. Langdon Brown, Lond.; British and Foreign Sailors' Society, Lond.; Mr. G. W. Baker, Leicester; Surg.-Gen. Sir David Bruce, A.M.S., C.B.
- C.—Dr. E. M. Clarke, Truro; Mr. H. A. Collins, Croydon; Dr. A. K. Chalmers, Glasgow; Mr. C. H. Cummins, Lond.; Dr. W. H. L. Copeland, Lond.; Dr. J. W. Cropper, Lond.; Mr. J. F. Colyer, Lond.
- D.—Dr. J. Donnelly, Gambaga; Drapers' Record, Lond.; Dr. F. V. Davison, Minas de Corrales; David Lewis Northern Hospital, Liverpool, Sec. Supt. of: Denver Chemical Manufacturing Co., Lond.; Miss J. H. Dewar, Lond.; Dr. V. Dickinson, Lond.; Lieut.-Col. L. S. Dudgeon, R.A.M.C.; Messrs. Duncan, Flockhart, and Co., Edinburgh.
- E.—East Suffolk and Ipswich Hospital, Ipswich, Sec. of; Lieut.-Col. T. R. Elliott, R.A.M.C.; Dr. J. Byre, Lond.
- F.—Capt. S. Fenwick, R.A.M.C.; Dr. W. M. Fletcher, Lond.; Factories, Chief Inspector of, Lond.; Finnish Booksellers, Ltd., Singers; Dr. F. Fox, Lond.; G.—Dr. C. D. Green, Romford; Capt. A. R. Green, R.A.M.C.; Mr. A. Garrow, Elgin; Grimsby County Borough, Town Clerk of; Mr. H. Grattan, Lond.; Capt. R. L. Gamlen, I.M.S. (ret'd.); Mr. E. W. H. Groves, Clevedon; Mr. H. J. Gauvain, Alton; H.—Dr. T. B. Harwood, Lond.; Capt. W. O. Halpin, R.A.M.C.; Major R. J. D. Hall, R.A.M.C.; Mr. F. W. Holland, Lond.; Dr. F. Hernaman-Johnson, Lond.; Holborn Surgical Instrument Co., Lond.; Dr. C. W. Hutt, Brighton; Messrs. W. and R. Holmes, Glasgow; Dr. N. B. Harman, Lond.; Messrs. A. Heywood and Son, Manchester; Dr. R. C. Holt, Manchester; Prof. M. Hartog, Cork; Mr. A. F. Hills, Penshurst.
- I.—Messrs. Isaacs and Co., Lond.
- J.—Capt. D. Johnston, R.A.M.C.; Capt. W. M. M. Jackson, R.A.M.C.; Dr. A. H. Joseph, Bexhill-on-Sea; Journal of State Medicine, Lond., Editor of.
- K.—Mr. D. Kennedy, Dublin; Kent Education Committee, Maidstone, Stores Supt. of; Prof. A. Keith, Lond.; Kensington and Fulham General Hospital, Sec. of.
- L.—Capt. T. Lyon, C.A.M.C.; Mr. C. E. Little, Birmingham; Messrs. H. K. Lewis and Co., Lond.; Dr. A. Love, Greenock; Local Government Board, Lond.; Mr. F. W. Lowndes, Liverpool; Dr. S. C. Lawrence, Lond.; London Throat Hospital, Sec. of; London and Provincial Retail Newsagents Association, Sec. of; London County Council Asylum and Mental Deficiency Committee, Accounting Officer of; Dr. M. Lesleur, Paris; Dr. G. C. Low, Lond.; Mrs. Langmead, Lond.; Messrs. Leslier, Lond.
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- N.—Mr. P. Newell, Margate; Mrs. Gladys Natrass, Jarrow-on-Tyne; National Council for Combating Venereal Diseases, Lond.; Mr. M. Nijhoff, The Hague; Newcastle upon-Tyne Education Committee, Director of; National Anti-Vaccination League, Lond., Sec. of; Newspaper Society, Lond., Sec. of; News vendre Benevolent and Provident Institution, Lond., Sec. of.
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- R.—Royal Academy of Medicine in Ireland, Dublin; Royal Institute of Painters in Water Colours; Dr. R. R. Rentoul, Liverpool; Royal Faculty of Physicians and Surgeons, Glasgow; Messrs. Vincent Roberts and Co., Leeds; Royal Sanitary Institute, Lond.; Royal Society of Arts, Lond.; Royal Hampshire County Hospital, Winchester, Sec. of; Royal Waterloo Hospital for Children and Women, Hon. Treas. of; Miss Reading, Grantham;
- Royal Cornwall Infirmary, Truro, Sec. of; Royal Albert Hospital, Devonport, House Steward of; Royal Statistical Society, Lond.; Royal Institute of Public Health, Lond.; Royal Society, Lond.; Royal Society of Medicine, Section of Obstetrics and Gynaecology, Lond.; Mr. T. Rooney, Nairn; Royal Society of Medicine, Editor of the Proceedings of.
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- T.—Dr. D. D. Tindal, Lond.; Capt. F. J. Tee, C.A.M.C.; Dr. L. M. G. de la Torre, Lima; Taunton, Sec. of.
- U.—Under-Secretary of State, Home Office, Lond.
- V.—Verkehrsverein Davos, Davos Platz; Mr. Voncken.
- W.—Dr. N. Walker, Edinburgh; Dr. E. W. A. Walker, Oxford; Wiltshire County Council, Trowbridge, County School Medical Officer of; Messrs. A. J. Wright, Lond.; Messrs. Willows, Francis, Butler, and Thompson; Messrs. W. Wood and Co., New York; Wolverhampton and Staffordshire General Hospital, Wolverhampton, House Governor of; Walsall and District Hospital, Sec. of; Messrs. Willing and Co., Lond.; Mr. C. L. H. Wallace, Lond.; Mr. J. W. T. Walker, Lond.; W. H. H.; Major G. W. Watson, R.A.M.C. (T.); Dr. H. Woods, Lond.; Dr. F. J. Wethered, Lond.
- Letters, each with enclosure, are also acknowledged from—
- A.—A. Y. G.; A. G. B.; A. G.; A. M.; Anglo-French Drug Co., Lond.;
- B.—Mr. E. G. F. Barnes, Dublin; Surg. H. O. Broadhurst, R.N.; Dr. J. Biernacki, Lond.; Messrs. Butterworth and Co., Lond.; Mr. C. Boulangé, Paris; Brentford Guardians, Clerk to the; Lieut. N. Brady, R.A.M.C.; Mr. P. L. Booth, Walney Island; Birmingham Education Committee, Treas. to the; Bradford Childrens' Hospital, Sec. of; Messrs. Bailey and Son, Lond.
- C.—Surg. H. Carlill, R.N.; Capt. M. M. Cruickshank, R.A.M.C.; Carlow District Lunatic Asylum, Medical Supt. of; Clandon Park Hospital, Guildford, Sec. of.
- D.—Devonshire Hospital, Buxton, Sec. of; Doctor, Southsea; Lieut.-Col. A. M. Davies, R.A.M.C.; Mr. W. Dowse, Birmingham; Capt. J. D. Dyson, R.A.M.C.; David Lewis Colony, Manchester, Sec. of; Dorset County Council, Dorchester, Clerk to the; D. A. H.
- E.—Dr. V. J. Elwell, Waterloo; Messrs. Elders and Fyffes, Lond.; Messrs. E. Evans and Sons, Shanghai.
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- G.—Surg. P. C. Gibson, R.N.; Capt. N. F. Graham, R.A.M.C.; Capt. G. W. Goodhart, R.A.M.C.; Major J. H. P. Graham, R.A.M.C.; Capt. P. W. Green, R.A.M.C.; Messrs. A. H. Grantham and Co., Reading; Messrs. Godsell and Barnett Smith, Lond.; E. T.; Dr. P. E. Garrett, Earl Shilton; Capt. H. D. Gillies, R.A.M.C.; H.—Messrs. Holt and Co., Lond.; H. M. Stationery Office, Lond.; Haslemere Nursing Home, Sec. of; H. G. D.; H. M. B.; Surg. F. G. Hitch, R.N.
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## The Lumleian Lectures

ON

### MODERN ASPECTS OF HEART DISEASE.

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#### LECTURE II.<sup>1</sup>

*Delivered on March 15th.*

##### DISTURBANCE OF CARDIAC RATE.

MR. PRESIDENT AND GENTLEMEN.—The second great disorder of the heart is characterised by a disturbance of the rate, which in the vast majority of cases means an acceleration, and in the minority a retardation, of rate. An increase of the heart's rate, as compared with the normal standard of adult life, may be found under various conditions, both physiological and pathological. Thus in infancy and childhood the heart beats more rapidly, and may be presumed to do so in order to meet the demands of the growing organism. In many forms of general disease an increase in the cardiac rate is part of the general disturbance, just as a rise in temperature is. The increase is not probably of much importance in itself and does not, as a rule, lead to any special symptoms.

##### *Acceleration of Cardiac Action.*

In connexion with actual disease of the heart, writers in the past have noted the frequent occurrence of a rapid cardiac action, and they have speculated widely as to the causes of this increase. As a rule the symptom, especially if progressive, has been ascribed to increasing feebleness of the myocardium and cardiac failure. The writers do not seem to have considered very fully what the results of a persistently rapid action are on a previously damaged heart. Yet this question is one of great practical importance in connexion with prognosis and treatment. The old terms "failure of compensation" and "broken compensation" conveyed no information of any value because the actual process at work was unknown. These descriptive terms are now known to apply to conditions of cardiac failure brought about in many cases by an increase of cardiac rate, or, to be more precise, by the weakening effect which the rapid rate has on the efficiency of the left ventricle.

It may be allowed that there is a certain range of alteration in the cardiac rate, above and below the normal, which in all probability has no important effect on the heart and leads to no symptoms. As regards an increase, if we take 75 beats per minute as the normal, an increase up to 100—that is, of 25 beats—will not probably be productive of any definite effect on a healthy heart. Similarly, a reduction of the rate to 50—that is, of 25 beats, will not of itself affect the efficiency of the heart. It is outside these limits that we find symptoms beginning to appear which are to be traced to the heart-rate. It is not only from the symptoms that we can infer that the rate is affecting the heart's efficiency; there are also definite changes in the heart itself, for example, dilatation, and evidences of a deficient circulation, for example, congestion of the liver, which may follow as a direct result of an excessively rapid action of the heart.

If we take 100 beats per minute as our limit for cardiac efficiency we shall find that every increase of 10 beats may make a difference in the efficiency. Such an increase certainly makes a difference in the strain thrown upon the heart, so that we may express the increase as being a 10 per cent., 20 per cent., or 50 per cent. added strain to the heart, according to the number of heart beats above 100 added per minute. Although the ventricular contractions are weaker as compared with those of the normal or slower rate, no perceptible changes may follow at first. Working at an increased rate the ventricle eventually suffers because of the loss or diminution of its normal resting time (diastole) when fresh energy is built up. It may be that for a time a doubling

of the ventricular rate allows of the circulation being maintained at its former level, or even in some ways of being improved, but the continuance of such a rate will eventually tell on the ventricular power. If we adopt the terms "rest power" and "reserve power" as applied to the heart, it will naturally be the reserve power which is diminished first.

It will probably be found that a continuous rate of 120, 130, or 140 will always tend to affect the ventricular action eventually. An 80 per cent. increase (rate of 180) will be sooner productive of serious results. These will arise even in hearts which have been previously healthy, but naturally they will be manifested sooner in hearts which are diseased. There are certain factors which have to be taken into account in estimating how a diseased heart will be affected by a marked increase of rate—that is, above the standard of 100 beats per minute. (1) The age of the patient. In the young an increase of rate is not so pathological or so productive of injurious effect as in adult life and old age. (2) The state of the myocardium of the left ventricle. A healthy myocardium will "carry on" successfully, when a diseased myocardium would show signs of stress. (3) The amount of strain already thrown on the ventricle from associated disease in other parts—for example, the presence of valvular lesions. (4) An associated irregularity of rhythm. The diastolic filling of the ventricle, already defective by reason of the arrhythmia, may be seriously interfered with by the shortening of the diastole. The effect of the cardiac irregularity may thus be much enhanced by an increase in the rate. (5) The suddenness of onset of a great increase of rate may disturb the ventricular action much more than if the process had been slow and progressive. This is well shown in some forms of tachycardia, when the heart has no time to accommodate itself to the excessively rapid action which sets in abruptly.

During the course of a general infection (rheumatic fever) or during active carditis an increase of cardiac rate may be regarded as a normal reaction. It does not, as a rule, demand any special treatment, because it is usually moderate in degree and a temporary disturbance. The class of case in which a rapid rate may be said to be injurious is that in which, in the absence of any general cause or local cardiac inflammation, there appears to be a permanently irritable or excitable focus in the heart. From this focus start numerous impulses which, while causing frequent contractions in the auricles, unimportant in character, may also cause an excessive rate of ventricular contractions. Under these conditions the increase of rate does not cease while the patient is asleep, although it may be less pronounced, and it may be considerably augmented by excitement or by physical exertion. The reserve power of the heart is certainly diminished in all such cases, and according to the degree and persistence of the increased rate the rest power may be encroached on. This subject will be further referred to when we deal with the question of therapeutics.

##### *Retardation of Cardiac Action.*

A slow rate of the heart, slower, that is, than 40 beats per minute, may also have, if prolonged, an injurious effect on the circulation. The ventricle does not suffer in itself, but under certain conditions it fails to maintain a sufficient supply and pressure of blood in different organs, more especially in the cerebral centres. A total bradycardia—that is, a slowing of the heart-rate which starts at the sinus node and is continued through the heart-beat—is not usually of clinical importance. The pathological slowing, which is important, will be found dealt with and explained under the heading of "Heart-block" in the current literature. It forms a particularly illuminating chapter in the history of the successful analysis of disturbances in the cardiac rhythm and rate. Gaskell found that by clamping the junctional tissues which form a bridge between the auricles and ventricles he was able to form a barrier or block, so that only a certain number of impulses passed through. According to the amount of pressure exercised, only every second or third or fourth impulse was able to pass, and the ventricular action was slowed accordingly. This is known as partial heart-block. By raising the pressure still more he was able to form a complete barrier or block, so that no impulses at all reached the ventricle from above. This is known as complete heart-block. When this happens a latent and unsuspected action of the ventricle comes into play, as shown

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by its starting a rhythm and rate of its own, at first rather irregular, but tending soon to settle down to a regular beat at a rate much below normal. So that below the junctional tissues, in some part of the ventricular wall, there lies a centre, usually dormant, capable of impulse formation and discharge and of starting ventricular contractions.

The clinical bearing of these facts has been very thoroughly worked out by Mackenzie. He showed that in disease partial heart-block is frequently produced through lesions of the junctional tissues. The conducting bridge of the junctional tissues becomes a barrier to the impulses descending from above, and only a certain number get through at regular or irregular intervals, so that the rate and regularity of the ventricular contractions bear no fixed relation to the auricular rate and regularity. The ventricular rate is influenced by the rate at which impulses are able to pass the barrier. The clinical proof of these conditions can be demonstrated very clearly by means of graphic records. It would appear, further, that partial heart-block may result not only from damage to the junctional tissues, but from an excessive number of stimuli descending from above and exhausting the powers of conductivity of normal junctional tissues. The bridge becomes blocked from excess of traffic. This is manifested in the clinical conditions of auricular flutter and auricular fibrillation. The conducting tissues are stimulated to such an extent that they are incapable of transmitting all the impulses reaching them. The condition of partial heart-block is thus seen to be proved in experimental physiology; it is also demonstrable in various forms of cardiac disease and disturbance, and it is capable of being induced by means of drugs in the treatment of heart disease, as will be described later in dealing with digitalis therapy.

Complete heart-block is the result of organic disease affecting the junctional tissues to such an extent that no impulses reach the ventricle from above. The idio-ventricular rhythm and rate which then develop, or which may develop, are apt at first to lead to attacks of syncope because of the prolongation of some of the diastolic pauses. After a time the action becomes more regular, the rate is usually about 30, and symptoms of ventricular inefficiency may disappear. The site of origin of this rhythmic action of the ventricles is now reasonably assumed to be in some part of the auriculo-ventricular bundle in connexion with the ventricles. One thing marks it out as different from all the other abnormal rhythms which have been considered. When a new rhythm has been started from some abnormal focus we have found that the rate was always faster than normal. As the result of complete heart-block the new rate of the ventricles is always slower than the normal rate. The new rate, although slow, may allow of a sufficient number of ventricular contractions to ensure the maintenance of the circulation, at perhaps a lower level than formerly. The important point about the new rhythm is that it should be regular. If the intervals between the beats are too prolonged the pressure in the cerebral vessels falls, and unconsciousness and even convulsive movements follow. These conditions are seen clinically in the symptom-complex which is known as Stokes-Adams's disease. If the ventricular rate falls below a certain level the intervals between the beats are so prolonged that death ensues.

#### *Relation of Disturbances to Supra-ventricular Tissues.*

The disturbances in rhythm and rate which we have been considering have come to occupy a most important place in connexion with the etiology of cardiac weakness and cardiac failure. We have already stated that these disturbances tend to affect injuriously the efficient action of the left ventricle. It is interesting to note, further, that every form of disordered action of the heart, be it an irregularity of rhythm or an excessive rate, or a diminished rate, is always supra-ventricular in origin. That is to say, these disturbances arise outside of the contractile muscle of the ventricles, except, perhaps, the ventricular extra-systole. There may be other exceptions to this, but so far as is at present known they must be extremely rare. Clinically, we find that the above general statement holds good. The supra-ventricular tissues, as previously defined, are the sino-auricular node, certain parts of the auricles, the auriculo-ventricular node, and the auriculo-ventricular bundle. In health these tissues regulate the rate and rhythm which are designed to lead up to efficient ventricular contractions. In diseased conditions of the heart disturbances in these tissues may lead, and do lead,

up to disordered and impaired ventricular action. Some forms of supra-ventricular disturbances if reproduced in their entirety in the ventricles would make efficient ventricular action impossible. Thus, if a condition of auricular fibrillation spread unchanged to the ventricles, efficient action of the latter would cease at once and a fatal termination would ensue. As a matter of fact, sudden death does occur from ventricular fibrillation, and it is now believed that sudden death under chloroform anaesthesia is due to ventricular fibrillation. By a process of blocking of certain of the impulses at the junctional tissues—partial heart-block—a diminished number of them reach the ventricles which are thus able to carry on the circulation. To express this in another way, impulse formation and impulse discharge may develop at a dangerous rate—dangerous, that is to say, if it spread to the ventricles—but the conducting tissues fail to develop the same rate of conductivity, and the ventricular action is successfully carried on.

The disturbances referred to above arise in the heart and as a result of disease of the heart. Other injurious influences arising from without may reach the heart through the nervous system and produce similar disturbances. They have first of all to pass through the defences of the supra-ventricular tissues, where they are often so modified that any threatened danger to the ventricles is removed. We may regard the vagus and the accelerator nerves as always on guard and controlling the functions of the supra-ventricular tissues for the benefit of the ventricles. So that it would appear that the ventricles are partially protected by the supra-ventricular tissues from disturbances which may arise in the heart itself or which may reach the heart from without.

#### *"Soldier's Heart."*

Amongst the varieties of disordered action of the heart the war has brought into prominent notice is one which is known as "the soldier's heart" or "the irritable heart of soldiers." It is in no sense comparable to the conditions we have been discussing and for this reason. The disordered action of the heart which occurs in heart disease is the result of definite changes in the muscular tissues of the heart, the supra-ventricular tissues more especially, which have arisen from inflammatory or degenerative lesions. The disorder is primarily cardiac in origin. On the other hand, the disorder in the case of the soldier's heart is essentially not cardiac in origin; it is the result of disturbance or disease in other parts of the system, which react on the heart and modify its action. This is shown in many ways. In the first place, we do not find any signs of organic heart disease to which the symptoms may be referred. The symptoms themselves are not such as can be definitely associated with any known form of heart disease, but they resemble closely those present in patients suffering from a "neurotic heart." Again, we find many other changes present which are not traceable to the cardiac condition, but clearly to a common cause. It is not the heart alone but the whole vascular system which is affected, and it is not affected in the way which we see as the result of heart disease. There is a loss of tone or power in the whole cardio-vascular system.

As regards the primary cause of the disturbances opinions still differ. Physical stress and strain, anxiety, sleeplessness, infective disease, preceding illness, and toxæmia have all been assigned the first place, and possibly each will be found to play a part if a sufficient number of cases are taken. Whatever the primary cause of disturbance one cannot fail to note in the patients the presence of nervous irritability and instability, that general condition which for want of a better term we call neurasthenia. It would appear likely from the symptoms in cases of "soldier's heart" that the cardiac phenomena do not proceed from the heart primarily, but from a disturbance of the power and action of the heart arising in the nervous centres which act on the heart. In an interesting analysis of 40 cases of "soldier's heart" John Parkinson found that in about half the cases the same disability had been present to some extent in the civil occupations pursued before the war. As he expresses it, "these men are the subjects of a cardiac disability which is unmasked by the exertion required of a soldier." This disability, whether constitutional or acquired, does not come into the category of organic heart disease. On the other hand, if certain symptoms persist—for instance, tachycardia—the effect on the heart may be as exhausting as if the tachycardia had been primarily cardiac in origin.

## DILATATION OF THE HEART.

Dilatation of the heart, of one or more of its chambers, has long been recognised amongst the changes associated with valvular disease. The view taken was that dilatation was a sign of weakness, a sign that the heart was yielding to some stress or strain more than it could effectively deal with. Another form of dilatation recognised was that in which the condition developed suddenly, usually in a heart previously diseased, and was accompanied by an increase in the old symptoms or the development of fresh ones. This was called acute dilatation of the heart, and the patient was subjected to treatment for the reduction of the dilatation. As we read the clinical reports of such cases it seems clear that the sudden onset of dilatation was usually the result of some strain thrown on the heart, and was associated with the presence in the heart of a disordered action of rate or rhythm, or both. We must not, therefore, assume off-hand that the dilatation was the primary condition, or that it was due to some essential weakness of the myocardium.

*Results of Experimental Research.*

The whole subject of dilatation, which in its most important aspect means dilatation of the left ventricle, is admittedly one of great difficulty. It deals with the qualities of tonicity, contractility, and relaxation in the cardiac muscular tissues. On the physiological side Starling and his co-workers have recently promulgated some new views on this subject.

They state that the ventricles cannot dilate unless fluid enters them. The view that there is such a condition as muscular dilatation, leading to a filling of the ventricles by suction, does not seem to receive physiological support. If blood does not enter the heart the ventricles do not dilate at all during diastole, and may become smaller with each systole until they are empty. This is not the result of increased tonicity of the heart, but is purely a mechanical result of absent or deficient venous inflow.

Comparing the cardiac muscle to an ordinary skeletal muscle, Starling says the extending load is represented by the diastolic intracardiac pressure and is dependent on the inflow; the load against which the cardiac muscle has to contract is represented by the pressure in the aorta. In his experiments he found that it was length of cardiac muscle rather than tension which determined the energy of contraction, so that there existed a direct proportion between the diastolic volume of the heart—that is, the length of its muscle fibres—and the energy set free in the following systole. This would seem to mean that to bring out the maximum capacity of a healthy heart a moderate dilatation is advantageous. Fatigue is shown by the fact that, starting at a given length, the change from the relaxed to the contracted state is attended with a smaller production of tension than was the case when the muscle was fresh. This means that a tired heart must dilate in order to carry on the same work as the fresh heart, and this is what Starling found actually occurred. If the condition is relieved, say by increasing the supply of oxygen to the heart or by diminishing the load, and the muscular tissue of the heart is given an opportunity to recover, the heart may once more return to its normal size, the evolution of energy per unit length of the muscle fibre at each contraction becoming the same as before.

This is his understanding of the word tonus or tone as applied to cardiac muscle. The term is properly employed as synonymous with physiological condition or fitness of the muscle fibre, and its measure is the energy set free per unit length of muscle fibre at each contraction of the heart. A good heart—that is, one with a good tone—will carry on a large circulation against a high arterial pressure and nearly empty itself at each contraction; while a heart with a defective tone, as is the case when it is tired, can carry on the same circulation, but only when its fibres at the beginning of contraction are much longer, that is when the heart is dilated. In the latter case the output of blood will be the same as in the former, but both the systolic and the diastolic volumes of the heart will be increased. When this dilatation proceeds to such an extent that the tension of the muscle fibres becomes increasingly inadequate in producing rise of intra-cardiac pressure, the fatigue of the heart passes on to cardiac failure.

*Clinical Support of Experimental Results.*

Turning to the clinical side we find a good deal of support for Starling's experimental results. In the case of

healthy children there is a marked instability of all the cardiac functions, and dilatation of the heart is by no means uncommon. The fluctuations in size of the heart at this age are such as to suggest strongly that there is a self-regulating influence at work, seated in the heart, which adjusts the size of the heart to the varying calls on its powers. In the case of severe athletic exercises, such as running a race, we find that the heart becomes temporarily dilated, apparently in all its chambers. Here, again, we may assume that the dilatation is the result of the strain thrown on the heart, and is called for in order to meet the difficulties of the circulation. When an attack of paroxysmal tachycardia sets in, the patient and his heart having been previously healthy, there is not necessarily any dilatation of the heart or any noticeable change except in rate. But when symptoms of fatigue of the heart appear, breathlessness, &c., dilatation usually comes on, and this may well be an effort to render the ventricular contractions more effective. When the attack of tachycardia ceases the cardiac dilatation usually subsides rapidly. The onset of auricular fibrillation is often characterised by great distress in the breathing and a marked degree of cardiac dilatation. Usually such dilatation has been ascribed to weakness of the wall of the left ventricle; but, on the other hand, it may simply be an attempt on the part of the heart to overcome the fresh difficulties of the circulation.

The point of view that dilatation is not necessarily an indication of weakness of the cardiac muscle, and may be one of the means by which the cardiac muscle meets a disturbance or difficulty in connexion with the circulation, does not imply that it meets all difficulties in this way or that cardiac failure cannot occur without dilatation. As a matter of fact, we know that the contrary holds true. Clinical research may well be directed into determining more exactly what are the underlying conditions which give rise to dilatation. Possibly it may be that in cases of extensive degeneration the cardiac muscle has lost the power of dilating. Starling has emphasised the fact that the question of dilatation is closely associated with the venous inflow of the heart, the quantity and the pressure of the flow. He says that the output of the heart is equal to, and determined by, the amount of blood flowing into the heart, and may be increased or diminished within very wide limits according to the inflow. With a minimal inflow the venous pressure on the two sides of the heart may be zero, and with increasing inflow rises at first only slightly as long as the amount of blood flowing in is not more than sufficient to exert a minimal distension on the relaxing ventricles. With further increase in the inflow the venous pressure may be positive during diastole, causing an active distension of the heart, and an increase in the rate of filling. The greater the arterial resistance the higher will be the venous pressure, for any given inflow. It seems probable from these conclusions that while certain disturbances, such as excessive rate or a disordered rhythm of the heart, may tend to induce dilatation, the question of the venous inflow and pressure has also an important bearing in determining the amount of dilatation.

## SYMPTOMS.

The discovery of physical signs of heart disturbance or disease is always satisfactory from a diagnostic point of view. The presence of a cardiac murmur or irregularity does not, however, convey much information as to the functional efficiency of the heart. This question is decided chiefly by the symptoms which are complained of by the patient, or which are brought out by testing the response of the heart to various forms of physical exertion.

Symptoms are the signals of distress sent out by the heart when its efficiency has become impaired. In cases of chronic heart disease the physical signs may persist unchanged for 10 or 20 years, and the first indications of weakening of the cardiac force are to be found in the symptoms. We have therefore come to regard symptoms as the most reliable evidence of impaired action of the heart and circulation. Amongst the chief of these symptoms may be mentioned breathlessness, pain, palpitation, languor, giddiness, faintness, and fainting.

A symptom may be unrecognised by the patient. For instance, breathlessness, quite apparent to outsiders, may have come on so gradually as not to have attracted the patient's attention. In other cases the symptom—for example, pain—may be not only recognised, but very much

emphasised and exaggerated by the patient. The sensitiveness of the individual varies to an enormous extent, so that while in some cases we hear of few symptoms in others we are met with a multiplicity of them which is embarrassing. In the one case more leading and particular questions are to be asked, and in the other the different symptoms are to be more minutely examined into. It has also to be recognised that many of the symptoms associated with organic disease are reproduced with marvellous accuracy in functional disturbances of the nervous system. So that in dealing with symptoms, and in order to estimate them at their proper value, the important thing is to establish a clear correlation between the physical signs of heart disease and the symptoms complained of or elicited by testing the response of the heart to effort. Further, as the symptoms of heart weakness are not distinctive, one has to exclude other possible causes than the heart. Such symptoms as breathlessness, praecordial pain, and palpitation may come from disturbances in various organs and regions of the body. An enlarged liver and fainting attacks are not necessarily due to heart disease. Shortness of breath and a cardiac murmur or irregularity may be present without organic heart disease. Chronic renal disease and arterio-sclerosis may lead to many symptoms not unlike those of heart disease. So that while in many cases the establishment of a definite correlation between the symptoms and the signs of cardiac disease may be easy, in others care may be necessary lest we assume too readily from the presence of symptoms the existence of heart disease as the cause. Patients are especially liable to fall into this error and to come with a ready-made diagnosis of "something wrong with the heart."

Symptoms are a measure of the difficulty with which the left ventricle is meeting some strain thrown on its action. Fatigue of the heart may be shown by symptoms only after some unusual exertion has been made which, however, the patient had previously been able to make without discomfort. A further stage—weakness of the heart—is shown when the patient has increasing difficulty in making any exertion without the onset of symptoms. In Mackenzie's language this implies a diminution in the "reserve power of the heart." A further stage—failure of the heart—is reached when symptoms are present even when the patient is resting in bed or on a chair. In Mackenzie's language this means a diminution of the "rest power of the heart." In connexion with heart disease, fatigue, weakness, and failure, as defined above and as shown by the symptoms, may be regarded as milestones indicating the progressive impairment of ventricular action. Whatever the physical signs in the heart may be, a sound prognosis must take into account the importance of the symptoms, and successful treatment will be shown by the diminution or cessation of the symptoms.

#### *Relative Importance of Signs and Symptoms at Different Ages.*

We expect and usually find symptoms present at all ages when the patient is the subject of acute heart disease (myocarditis, endocarditis, pericarditis), or of a sudden and severe disturbance of rhythm such as auricular fibrillation. In the chronic forms of heart disease we find a marked difference in the relative importance of symptoms and physical signs at different ages in estimating the question of cardiac impairment.

In the young, say up to the age of 15 years, heart disease is usually part of the rheumatic infection. At this period of life the re-operative powers of the heart after an acute attack are little short of marvellous, and the symptoms manifested or complained of are often extremely slight or absent altogether. Yet the heart may have been permanently damaged. At this age, therefore, the physical signs of disease are much more important than the symptoms in forming an estimate as to how far the cardiac efficiency has been or will be impaired. It is on the physical signs that the prognosis is to be based, so far as a prognosis can be given during the years when rheumatic reinfection is so apt to occur. Symptoms, the result of disease in early life, may not assume any importance until maturity is reached or even later. Possibly the physical signs of disease may not have altered much since childhood, but impairment of the functional efficiency of the left ventricle will first of all be indicated by symptoms when the physical stress of life has begun to tell on the previously damaged heart.

From middle life on through old age there is another large class of case met with—namely, those with degenerative changes in the musculature of the heart. Here the physical signs of heart disease may be slight or absent, but the symptoms are often clearly indicative of weakness in the action of the left ventricle. The extent of the weakness can be roughly estimated by the response which the individual makes to effort, long before confirmatory evidence is obtained in the form of oedema, &c.

#### CARDIAC THERAPEUTICS.

In acute inflammatory disease of the heart it is generally agreed that the field of direct cardiac therapeutics is extremely limited. We employ measures to allay or remove any infective disease in the system, such as rheumatic infection, and we adopt those measures which experience has shown useful in the case of fevers generally. We do not possess any direct means of checking disturbed action or strengthening cardiac action when the heart is in a state of inflammation, acute or subacute. This period is short-lived compared with that which follows, in which the effects are shown in the form of chronic heart disease. The time at which the treatment of chronic heart disease begins and the form which it takes seem to vary considerably with the individual therapist. In some cases whenever a cardiac murmur is discovered digitalis is given. In others, when a valvular lesion is diagnosed from the murmur, digitalis is given. In others, when some change in the heart is diagnosed as the result of a valvular lesion, digitalis is given. In others again, while valvular lesions and cardiac changes may have been recognised, treatment is deferred until "compensation has broken down." These statements are not based on the teaching or text-books of the day, but on the experience gained in professional intercourse. It is not necessary to consider any treatment which is based merely on a cardiac murmur or a valvular lesion, but that based on failure of compensation calls for comment.

#### *Nature of Compensation and Compensatory Changes.*

The so-called compensatory changes are the result of efforts which the heart has made to overcome some mechanical interference with its efficient action. In its simplest form it is seen in the dilatation and hypertrophy of the wall of some chamber in order to overcome the effect of an obstruction in front, for instance, the right ventricle in mitral stenosis. We may compare this with the dilatation and hypertrophy of the stomach wall in pyloric stenosis. The compensatory change is more complicated in the case of aortic regurgitation with mitral regurgitation when the left ventricle has to compensate for a great loss of its systolic power by a double valvular leakage. In the case of adherent pericardium, when some part of the heart is fixed to the chest wall, the compensatory changes may be of a most complicated kind because of the tying down of the heart.

In all of these cases great changes may take place in the size of the heart, and they are evidently purposive and directed solely to the carrying on of the circulation. How are they brought about? It would appear that the automatic powers of the heart are solely responsible for these changes. For they are manifested in cases in which no treatment has been adopted, and they are seen more especially in youth when the natural recuperative and adaptive powers of the heart are much greater than in later life. In the case of a very large and hypertrophied heart we may assume that the unaided powers of nature have produced the condition, and that the enlargement is compensatory in character. There is no known method of producing such a result by drugs or other treatment, and it is very doubtful whether we shall ever be able to improve on it.

#### *Condition when Compensation has Broken Down.*

Such would appear to be the nature of compensation and compensatory changes. What is the condition when compensation has broken down? The term "failure of compensation" was applied in cases where there was a more or less sudden breakdown of the heart, with marked subjective symptoms of distress and usually with well-defined physical changes in the heart. The old view was that the heart had given out. Sometimes it was described as "right-sided failure" and sometimes as "left-sided failure," according to the predominance of certain signs. The aim of hopeful therapeutics was "to increase the tone of the heart muscle," or "to strengthen the cardiac action," or "to improve the

contractile power of the heart," as it was variously expressed. Now, if we are not able to add one muscular fibre to the heart or to improve the contractile power of the heart in order to prevent the "failure of compensation" it does not appear to be likely that we shall be able to do so when failure has set in. Yet this was what was usually attempted in cases of "loss of compensation" and what many claim still that they can do by means of digitalis.

There may be attacks of cardiac weakness induced by over-exertion or illness, but they are temporary and relieved by rest and do not fall within the category of failure of compensation. There may also be failure of the power of the left ventricle to carry on the circulation, a primary loss of contractile power from exhaustion, in which case the end is not usually far off, and treatment is of little avail. But in the vast majority of cases of "failure of compensation" with symptoms there is a new factor present which is of great importance. That factor is the development of a new and abnormal rhythm in the heart, which has interfered with the cardiac action to such an extent that a "failure of compensation" has been diagnosed. The abnormal rhythm is, as a rule, accompanied by a great increase in the ventricular rate, and this adds to the impairment of the cardiac efficiency.

Now the importance of these two, an abnormal rhythm and a rapid action of the heart, would appear to lie in this, that they react so injuriously on the ventricular contractions as to produce the signs and symptoms on which a diagnosis of "failure of compensation" has been based. One might say that there has been a disturbance of the compensatory action of the heart, in the sense that this action is weakened from the presence of a new rhythm or from tachycardia. But to say that "compensation is lost" is to say that all is lost, for the carrying on of the circulation has been dependent on the compensatory changes, and we cannot influence them directly. As a matter of fact, in cases coming under this description we know that if the disturbing factors are removed or checked by treatment the compensatory changes will be found unimpaired and ready to carry on the circulation efficiently. Successful treatment will depend on the recognition of the exact form of disturbance which has upset compensation and on the application of the above facts in the employment of our chief drug in heart disease—namely, digitalis.

#### *Direct or Indirect Action of Digitalis?*

In considering the action of digitalis a clear distinction must be drawn between its direct and indirect action. The fact that it has a special and direct action on the cardiac action is universally accepted, and the method of this action will be discussed later on. It has also been maintained by many that digitalis has a direct action on the kidneys, on the arterioles, and on the blood pressure, while others assert that this is only an indirect action due to and dependent on the increase in the cardiac efficiency. The former view is probably based chiefly on experimental work on animals, the deductions from which have been applied, without clinical observation, to the human subject under conditions of cardiac failure. Experience has shown that conclusions of this nature are extremely unreliable.

The view that digitalis has only an indirect action on the kidneys is now strongly supported by pharmacologists and physicians. Cushny states that the diuresis "appears to arise not from a direct action on the secretory mechanism, but only indirectly through the changes in the circulation; the kidney shares in the general acceleration of the blood and functions more vigorously." The change in the renal activity under digitalis is not due to any local vascular action but to the augmented activity of the heart, which improves the nutrition and promotes the activity of the kidney. At the same time, the increased power of the heart quickens the circulation in the lymphatic system, dropsical fluids are reabsorbed into the blood-vessels, and are excreted by the kidney.

These views of Cushny appear to fit in very well with the clinical results which we obtain from digitalis. We can see similar circulatory changes produced in other organs of the body—for example, the liver. In heart failure the liver is often swollen and engorged with blood, the patient is jaundiced, and bile appears in the urine. The condition is assumed to be one of hepatic venous congestion with deficient excretion of bile. When the cardiac efficiency has been restored by means of digitalis the hepatic con-

gestion and swelling subside and bile is again freely excreted. We do not say that in such cases digitalis acts as a chalagogue, or assume that it has any direct action on the liver, although its action here is probably exactly the same as on the kidneys. Similarly, when the clouded brain is cleared, the edematous lungs are relieved, and the stomach and intestines are freed from their congestion, we do not consider that digitalis has a special action on these tissues.

Another fact to be remembered is that digitalis has not been found to be efficient as a diuretic save in cases of cardiac dropsy. Its employment for diuretic purposes may be said to be confined to cases of cardiac disease with dropsy. Those who accept the view that digitalis is a diuretic because of its direct action on the kidneys must be prepared to show that there is some special condition present in the kidneys peculiar to cardiac dropsy. No such condition is known, and, in fact, in many cases when the congestion of the kidneys has been relieved the kidneys are found to be perfectly healthy.

#### *Diuretic Action of Digitalis Alone and Combined with Theocine.*

In many cases we can say with confidence that the dropsy will disappear when digitalis has restored efficient cardiac action. We do not understand fully the underlying causes of oliguria in cardiac cases, any more than we know the exact mechanism of cardiac oedema, but we can observe sequences in the treatment of dropsy. In my experience the diuretic action under digitalis is often of a sluice-gate character, in which some holding back influence has been removed and the excess of fluid is poured out through the kidneys. The time at which this is secured is more or less synchronous with the recovery of ventricular efficiency, and in the most typical cases this comes soon after the cardiac rate has been lowered. If, on the other hand, the cardiac rate has been and continues normal, and no appreciable change in the cardiac efficiency takes place under digitalis, we do not usually find much evidence of a diuretic effect.

In some cases we do not get the expected diuretic action of digitalis, even although it may have been effective in relieving the other symptoms. Something additional seems to be required to "tip the balance" and make the kidneys act. This may be accomplished by such means as a sharp purge or dose of mercury, or by partially relieving the dropsy by Southey's tubes, or it may be brought about by some such trifling alteration as a change of posture, as Mackenzie points out. He finds that "the kidney functions, when there is dropsy, are peculiarly unstable," and this is probably the common experience.

It will also be found that the caffeine series of preparations, when used along with digitalis, are at times very effective in inducing diuresis. I cannot specify the exact underlying renal conditions which are present. It has appeared to me that the theocine-digitalis combination has proved specially suitable in cardio-renal cases—that is, when both heart and kidneys are diseased. A most efficient preparation is theocine-sodium-acetate, and the action is often very striking. Unlike that of digitalis it begins almost at once, and may start within an hour of the first dose. If no effect is manifested within 24 hours or after 40 grains it is of little use continuing the drug. Theocine appears to act most effectively in combination with digitalis and after the patient has taken a sufficient amount of digitalis to affect the heart. While digitalis alone may procure a diuretic effect theocine alone is not usually effective if the dropsy is essentially cardiac in origin. The action of theocine is no accidental one, for it can be repeated in the same case, and its effect is so prompt that the element of chance can be excluded.

The diuretic action of digitalis in cardiac dropsy can only be estimated properly when the kidneys are healthy and merely disturbed in their function from circulatory weakness. If renal disease is present other factors may come into play which cannot at present be estimated. The diuretic effect under digitalis is not usually started until after 48 hours from the commencement of treatment. This of itself is suggestive of an indirect rather than a direct diuretic action. Mackenzie has noted in some cases the onset of diuresis within 48 hours of the administration of digitalis and before any effect on the heart was perceptible. He thinks "it is probable that the beneficial effect produced by the drug is

due to its diuretic effect rather than to its action on the heart." We have already considered some difficulties in the way of accepting this view. In several of his cases chronic renal disease was present so that they were not suitable for deciding the question at issue. Accepting his facts as to these exceptional cases, we may offer another explanation than the one he has given. Digitalis, amongst its other effects, has an irritant action on certain tissues which is more pronounced in some people than in others. Thus diarrhoea may follow quickly from the use of quite moderate doses. Cushing points out that digitalis may act as an irritant to the renal epithelium, as the appearance of blood and albumin in the urine of animals after large doses of digitalis shows. Mackenzie usually begins treatment with full therapeutic doses of digitalis, and the irritant action of the drug may have told on the kidneys before the cardiac action has had time to take effect. Such an action would not bring digitalis into the category of diuretic drugs, although it might explain the early diuretic effect in some cases of cardiac dropsy.

#### *Action of Digitalis on Arterioles and Blood Pressure.*

It was formerly held by pharmacologists, as the result of experimental work, that digitalis contracted the arterioles in animals and raised the blood pressure. These statements were accepted by clinicians as applicable to the employment of therapeutic doses of digitalis in man for heart disease. Further, warnings were given that owing to this action care must be taken in certain forms of heart disease lest it should react injuriously on a weakened heart. More recent pharmacological investigations have shown that digitalis has no such action on the blood pressure, which is affected only by the increased efficiency of the cardiac contractions. Cushing points out that there is a balanced action between the increased force of the heart's contractions and the tone of the vasoconstrictor system. An augmented efficiency in cardiac contraction would lead to a rise in blood pressure provided that the blood vessels remained unchanged in calibre. But as the output of the heart increases the vessels relax in proportion and the flow of blood is accelerated. This compensatory action arises in the vasoconstrictor centre, and as long as it persists the blood pressure does not rise.

Cushing's conclusions have been supported clinically by the investigations of Mackenzie and his pupils. In what is perhaps the most important form of disease in this connexion—namely, auricular fibrillation—they found that no estimate of the blood pressure could be made, as it was constantly changing. In cases with a regular rhythm they could detect no appreciable effect upon the blood pressure. Digitalis and the blood pressure is still a subject of interest to senior students because of its value for examination purposes, but after the examination is passed the student may dismiss the subject and rest assured that its value to him from the clinical and therapeutic point of view is negligible.

## "SOLDIER'S HEART."<sup>1</sup>

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IN considering the subject of heart affections as they are encountered in soldiers it will be desirable in the outset to say a few words about the term "soldier's heart," which has now acquired an accepted position in our nomenclature of diseases, one which certainly appears to supply a definite need in corresponding to a definite condition, but, unfortunately, also one which is employed with so much abuse that it is impossible not to regret that such a term should ever have been introduced. We ought to restrict its application to patients who are suffering from cardiac affections, or, at any rate, cardiac symptoms due in some way to military service. In this sense soldier's heart would be an occupation disease, as we speak of miner's nystagmus, scrivener's palsy, or housemaid's knee. But whereas there exists a special group of cases which in my opinion corresponds to such a restriction, even though the exact determining cause is still a subject for contention, the term is applied indis-

criminally to a large variety of symptoms which are evident in men who happen to be temporarily khaki-clad and most of which have nothing whatever to do with the heart, nor, for that matter, with military service.

And this reminds me to refer briefly to that question-begging epithet which is so conveniently employed in these days, D.A.H. (disordered action of the heart). Now, whatever words of depreciation may be considered suitable to apply in the case of the aforementioned "soldier's heart" these fade into insignificance when you select those condemnatory enough for its blood-relation D.A.H. I do not hesitate to say that I have seen men complaining of symptoms referable to every disease above the umbilicus sent in as D.A.H., and I am not at all sure that a certain number below this anatomical landmark have not been included. But even if one eliminates those cases of so-called D.A.H. which pass the first portal re-labelled N.Y.D. (not yet diagnosed) and are finally discharged as N.A.D. (no appreciable disease), what exactly does an honest attempt to use the words involve? What precisely is orderly action of the heart and when does chaos usurp the place of cosmos in the circulatory world? And in the second place is it not absurd at this stage of our knowledge of the etiology of disease to imagine that a diagnosis of tachycardia is a diagnosis, or that it is sufficient to say that a pulse is irregular or intermittent without taking the trouble to see what is the nature of the irregularity and if, as a matter of fact, its existence is of the slightest consequence?

In recalling to your memory the copious literature which has already appeared on the subject of "soldier's heart" during the last couple of years, I would suggest to you that a large variety of different conditions have been at various times described as if they were all the same thing. And I think the best way to support this proposition is to enumerate a representative collection of the causes which have been advanced.

First and foremost very naturally is the endeavour to ascribe all cases to exertion. Here, then, is our old friend "strained heart" or "athlete's heart" in modern form. To adapt the condition to military circumstances such features are introduced as marches with weights, shoulder-straps, and the other paraphernalia of service and service kit. The subject of heart-strain I will postpone to consider later in detail.

As a sort of corollary to this school there is another which presupposes the existence of a great deal of latent unsuspected cardiac disease which only manifests itself in consequence of the strain, physical or mental, or both physical and mental of military life.

To other authorities the condition is due to a toxæmia. If microbial influence is demanded—well, organisms are so easily introduced, from the teeth, for example, or from the food itself, and even if you are deprived of organisms there are always toxins to fall back upon. And if toxins likewise are denied, there are perverted products of metabolism, and some authors blame the excessive protein diet of the soldier.

Another large group of authorities attribute the condition to the thyroid gland. The majority of these think there is hyper-thyroidism, though a few believe the secretion to be normal in quantity, but of pathological quality. The soldier's heart to this school is simply larval Graves's disease.

At least every other week somebody writes to the medical journals explaining "soldier's heart" to be due to excessive cigarette-smoking, and considering the almost universal prevalence of this vice such an opinion has at least the support of reasonableness.

Recently "soldier's heart" has been attributed to deficiency of buffer-salts in the blood, and such an explanation is not without its inconvenience in view of the difficulty in technique in estimating these salts, more especially as I will be impudent enough to hint that the majority of us are more than vague as to what a buffer-salt is, what it does, and why its absence should produce symptoms of cardiac disease.

One turns next to an entirely different interpretation of "soldier's heart" in introducing the school which supports a psychical origin. Its disciples see no necessity to invoke the existence of any organic pathological cause. In fact, they see no necessity to suppose the existence of any sign of heart disease. They point out that the symptoms, although equally familiar in genuine heart trouble, are quite easily or at least speciously, explainable on a non-organic basis and that a

<sup>1</sup> A paper read before the Connaught Hospital Medical Society.

man who has hitherto adapted himself to the most sedentary life, suddenly forced into the activity of unaccustomed exercise, pants and puffs and finds it much easier to sit down than to try to keep going. The symptom of praecordial pain in such cases is generally indigestion due to bad teeth.

Now it seems to me that every one of these explanations is probably right—that is to say, that among the enormous number of cases one meets in the Army with symptoms of breathlessness on exertion, of praecordial pain, and of general so-called cardiac distress there are some which may be explained in every one of these ways. And if I may venture to criticise those of far greater experience to whom we look for guidance, I think they have often made the mistake of laying too much emphasis upon the particular condition they are describing to the exclusion of absolutely all else, and unconsciously, and of course unintentionally, giving the impression that they were dealing with the whole of the cases comprised under "soldier's heart."

I hold the view that the large majority of cases which are labelled "soldier's heart" and condemned as unfit for active service have a perfectly normal myocardium and suffer from symptoms which have no organic basis. I would, then, suggest to you that we may classify the cases which are sent up to us with symptoms or signs which might be referable to the heart in the following way:—

1. Functional cases. A large number of men at the outset of their military duties who are free from any organic disease, but who have hitherto been quite unused to any form of exertion and readily display symptoms of distress or of fatigue.

2. Cases with symptoms due to excessive smoking or other drugs and disappearing upon appropriate treatment.

3. Organic disease: (a) Valvular disease (1) compensated, (2) uncompensated; (b) myocardial disease; (c) adherent pericardium; (d) Graves's disease.

4. Genuine soldier's heart.

I shall not deal with these groups seriatim, but I shall refer to them indiscriminately in considering general principles.

The first general principle with which we should be concerned is the fundamental question of so-called *overstrain of the heart*. I would mention in passing that Sir Clifford Allbutt points out that this expression is tautological since all strain must be overstrain.

When one has the support of Sir James Mackenzie one need not hesitate to state dogmatically a disbelief in "heart-strain" or "athletic heart." As a matter of fact, on purely empirical and not clinical grounds I never have believed in it; but it is one thing to state what is regarded as a worthless opinion based on inexperience and differing from common acceptance, and another to express a point of view which receives the cachet of the doyen of cardiologists. And Sir James Mackenzie says of "athlete's heart":—

"Personally I have never seen such a thing and, when my opportunities of observation are considered, I think it will be allowed that I would have seen it if it had really existed." He says further: "I have had brought to me great numbers of young people of both sexes with hearts said to have been impaired by overstrain. I have not found a single case of dilatation with heart failure. That dilatation can be produced in a healthy heart as a result of overstrain, more particularly among the young and athletic, is a belief widely held. I am convinced that it is a view which is not justified. I never saw a single individual who suffered from heart dilatation as the result of over-exertion. I think I may fairly say that this was not due to inability to recognise overstrain."

With such a sentiment as the last is there anybody who will disagree?

I cannot lay claim to an experience which would justify me in the presumption of endorsing an opinion of Sir James Mackenzie, but I can at least claim a special experience which is in its way even greater than his. For eight years there has been practically no prominent athlete in any country in Europe (and a good many from the colonies and from America) whom I have not had an opportunity of examining before and after exercise. I have been hunting the "athletic heart" all this time in sprinters, middle-distance runners, Marathon runners, and I have never caught it.

And yet, it will be urged, our eminent predecessors published cases of dilated heart and overstrain which were clearly the result of exertion. In some cases a comparatively

recent antecedent infection is definitely stated, in others it is hinted at. And in others, again, a coincidence is well worth noting that both Sir Clifford Allbut and the late Sir Lauder Brunton describe cases of acute dilatation occurring during mountain climbing. Now the physiology of high altitudes is rather queer in itself; a large increase in red corpuscles has been shown to occur, and it is quite possible that by mere mechanical friction they retard circulation to some extent.

A priori there should be no expectation of the heart failing through pressure of work any more than of a diaphragm becoming fatigued. Nature is not likely to jeopardise the well-being of the most important muscle in the body but safeguards it by ensuring that everything else shall give in first. When a man is badly done up as the result of a big effort it is not cardiac failure but vaso-motor exhaustion from which he is suffering and his symptoms are due to nothing more serious. Personal experiences, however feeble, have at least a certain peculiar merit which is my excuse for obtruding these. During 16 years of practically continuous competitive athletics I have known frequently what it feels like to be badly run out or rowed out, but I remember only two special instances which stand out prominently. On the first occasion I had won a particularly hard 200 yards race and I can only attribute the nausea, dyspnoea, and dreadful headache from which I suffered the rest of that day as due to an extra effort induced by an exceptional keenness to win. Had I sought advice for my symptoms I might still be in bed or just beginning graduated exercises, but as this was the middle of a big athletic season I determined to adopt the best form of investigation I could think of, and the following morning I went out and ran, with very great relief to my doubts, one of the finest quarter-miles I have ever run. The second occasion was six years ago. Starting from Grindelwald, I went up the Faulhorn and down practically without a stop in four and a half hours. One hour after I had reached the bottom I began to experience intense nausea, and I fainted. I believe that these symptoms were due to the exhaustion from want of food. Once again alarm demanded a critical investigation, and 48 hours later I went up the Faulhorn as hard as I could go; but on this excursion I ate a good déjeuner, and rested for an hour at the top before running down, and I had not the slightest symptom of distress of any kind.

It is easy to understand how soldiers on the march faint, especially in hot weather, when their peripheral vessels are dilated to such an extent as to deplete the brain. Of course, some people are much more liable than others to these attacks from the particular tendency of their blood to drain into the large abdominal veins. Such attacks, too, are largely precipitated by the boredom of a march. The fatigue of disheartenment is a very well-recognised thing.

I put it to you that physical exertion is mainly a matter of will-power. Some men have the will to drive the engine harder than others. But, granting no flaw in the machinery, nobody can drive it to breaking point.

In the consideration of *organic disease of the heart* we have first to deal with the question of *cardiac murmurs*. Sir James Mackenzie says:—

"The presence of a murmur is often considered to be inconsistent with the idea of a healthy heart, and the great bulk of the profession and the teachers of the profession do adhere to this view." Further, he says: "Every graduate leaves hospital with but the vaguest notion how to assess the value of a murmur."

I think I may assert that there is not one of us here who does not almost every day see at least one striking example of the absurdity of worrying about the existence of a murmur qua murmur, a survival of student days when prolonged arguments were wasted upon the exact timing of some miserable squeak, to say nothing of the decision whether there was any murmur there at all. As a consequence we gained the impression from our teachers that the slightest alteration in the character of the heart sounds meant serious organic cardiac mischief, and the fruit of this teaching has been, in civil life, the obstacles placed in the way of such people ever getting insured, and in military life the wholesale rejection of perfectly healthy subjects physically fit for anything; so depriving the country of a number of efficient soldiers, and, what is even worse, condemning to a serious restriction of useful and wholesome

activity many men who for the rest of their lives walk about gingerly with the sort of sensation that they have a bomb inside them and with the perpetual dread of sudden death.

Now so long as the heart does its work properly what does a little music in its mechanism matter? Some motor engines purr, others bark, and others roar, yet all may be equally efficient; and the murmur in the heart may bear no more relation to the heart's capacity for work than, to continue the parallel, need a squeak in a spring have anything to do with the engine.

Many murmurs are, of course, not cardiac at all, but due to pressure relations of the pulmonary artery and the chest wall or to some other simple extra-cardiac cause. The distinction of physiological murmurs is usually quite easy if one is not wedded to the idea that heart disease is so common that it must always be suspected. And although organic murmurs must in any case denote a certain degree of disability, even organic murmurs are not necessarily of much consequence. As a convenient rule, Sir James Mackenzie has said that a systolic apical murmur may always be disregarded when there is no sign of enlargement of the heart, for, as he says, "if a murmur is caused by a lesion which embarrasses a chamber in its work, that chamber will alter in form either by dilating or becoming hypertrophied." So that to talk of V.D.H. (valvular disease of the heart) as a definite condition always calling for discharge from the Army as permanently unfit is quite unreasonable. To put it in the terms of a common pleasantry, there is V.D.H. and V.D.H. The heart's capacity for doing work is the vital criterion, and I am quite sure that many cases of well-marked valvular disease are little, if any, handicapped by their disability.

The heart muscle is, of course, the great factor in cardiac efficiency. If we could always measure the quality of the muscle we should find it easy to estimate the general condition of the heart, and the discovery of myocarditis with corresponding prognosis would be a simple matter. But a person's description of his inability to exert himself is, in my opinion, a very poor guide, although, as you are well aware, more than one cardiologist has stated that we are to accept a complaint of pain, dyspnoea, giddiness, &c., as absolute evidence of cardiac disability, even in the absence of abnormal physical signs in the heart.

As aids in estimating the cardiac efficiency, various tests have been elaborated—e.g., Grapner's; and various instruments have been invented, such as the Bock stethoscope, the application of which has been particularly encouraged of recent date by Dr. O. Leyton. The tests depend upon the differences observed between the pulse-rates and blood pressures in the resting state in the horizontal and erect positions and in the reaction to exercise. The Bock stethoscope is an arrangement which gives a numerical value to the audibility of the first sound at the apex and the second at the aortic base. A heart with normal musculature yields a ratio of 60:40. The nearer the ratio approaches unity the more the myocardium is pathologically affected. We have used the instrument fairly extensively here, and have come to the conclusion that it has a useful application. The chief difficulty in our experience is the necessity for absolute silence during observation, otherwise the error may be so great as to render the result quite useless. The instrument is said to be inapplicable when murmurs are present.

It is unnecessary to deal with the well-known signs of obvious cardiac distress—e.g., cyanosis and oedema. It might be thought that *dyspnoea* is equally obvious as a sign of cardiac inefficiency, but in this sign there is the possibility of a large functional element. The majority of the ill-fed, flat-chested, poorly developed men who enter the Army after an uneventful sedentary life and are then plunged into what is to them unalluring strenuous activity naturally puff and blow and complain of pain in the chest. Again, the *dyspnoea* of what I call a case of real soldier's heart is often an hysterical polypnoea and calls for vigorous physical and mental discipline.

*Pain* on exertion is, again, a very vague symptom. The pain complained of by false cardiopaths is usually praecordial and not substernal as in true angina, and the pain does not radiate. It often disappears after effective dental treatment, and especially if the man can be persuaded to overcome the inevitable distress of his first exertions and persevere. But once let a man get the idea that he has a weak heart and

any hypochondriacal "pain in his heart" speaks to him of sudden death. Speaking generally, we do not think of cardiac disease as associated with pain in the chest and when a man complains thus of his heart one is justified in thinking of his stomach.

It is one of the most important and often one of the most difficult things to decide the meaning of a *cardiac irregularity*. The general tendency is to regard any divergence from a perfectly regular rhythm as evidence of cardiac disease. But, on the contrary, some forms of irregularity are of no pathological importance whatever; indeed, one form, sinus arrhythmia, is even stated to be a particularly good sign that the heart is normal, a sort of hall-mark of a healthy heart. On the other hand, there are types of irregularity which give an absolute indication of serious myocardial change and their determination is far more useful than that of the size of the heart or of any murmur.

*Sinus irregularity* is a variability in the intervals of diastole. It can be produced in susceptible subjects by stimulating the vagus centre—e.g., by swallowing or deep breathing, for it is related to irritability of the centre. It can be completely abolished by exertion. Such an irregularity is, as I have said, of no pathological importance.

*Extrasystoles*, or, as they are more correctly termed, *premature contractions*, are recognised by the circumstance that the "extra beat" anticipates a regular contraction and is followed by a longer pause than after an ordinary beat. It is the long pause which is so unpleasantly apparent to the subject himself. Extrasystoles are often of no pathological consequence, and can be abolished by exercise. On the other hand, they may indicate myocardial disease. They constitute, therefore, one sign only which has to be taken into consideration with all the other cardiac phenomena.

*Pulsus alternans* is a condition in which alternate beats are of unequal volume. It is a very grave sign of myocardial disease. It is obvious that some care is necessary to distinguish this condition from one in which premature contractions occur after every full beat. In the latter there is always a longer pause after the weaker (the premature) beat. In *pulsus alternans* the beats are regular and the intervals equal.

*Atrial fibrillation* is a condition of irregularity in which beats vary in frequency and volume in a completely irregular manner. It is not decreased but generally increased by exercise, and it is a sign of serious organic disease.

*Heart-block*, in which the rhythm is disturbed at regular intervals by the dropping out of a beat, is always a sign of serious heart disease.

Whilst it is the rarest possible thing for a soldier to be sent up as D.A.H. with *bradycardia*, the number sent up as *tachycardia* far exceeds the total of all the other cases (I mean by tachycardia simply undue acceleration of the rate, whilst I would remind you that some authorities restrict the term to a special type of acceleration—*paroxysmal tachycardia*). Now to speak of tachycardia as a distinct condition, when it may be due to such diverse causes as acute peritonitis and drinking too much tea, is as absurd as to label a case abdominal pain when this symptom may be due to indigestion, appendicitis, caries of the spine, pneumonia, or a host of other things. In the first place, some people appear to have a physiological tachycardia and own a heart which runs normally at 110 perhaps and gives rise to no symptoms. When a patient complains of the usual cardiac symptoms it is clearly necessary to exclude all organic causes of tachycardia—e.g., tuberculosis, valvular disease, myocardial degeneration, adherent pericardium, Graves's disease, and any obvious functional cause, such as excessive smoking. We are then left with a residue of cases about which it seems impossible to decide, in whom there is nothing definitely organic unless you invoke larval Graves's disease. In this type of case there is, of course, no exophthalmos and no enlarged thyroid to aid the diagnosis, but the presence of tachycardia, of tremors, and of nervousness justifies one in diagnosing, according to inclination, larval Graves's disease or a neurotic condition with, as Sir Clifford Allbutt puts it, "a diffuse assemblage of mere accelerations."

And this brings me finally to what I think may legitimately be called *soldier's heart*. I premise as the patient a man who really has been a soldier and exposed to the vicissitudes of warfare. Is the influence of warfare, physical strain, toxin, or psychic trauma? The factor of strain I have done

my best to eliminate. A few words will deal with the other possibilities that have been raised. The patient presents symptoms generally of dyspnoea, always of fatigue on slight exertion, lassitude, persistent tachycardia without cardiac enlargement, and perhaps a variable number of neurotic manifestations. There is invariably a history of psychic trauma—it may be one acute occasion or a long-continued bombardment by greater or smaller shocks.

These are the cases for exhaustive investigation, for the detection of toxins, for the estimation of buffer-salts, for the consideration of the balance of the ductless glands, for inquiry into the previous psychical history.

It is unsatisfactory to invoke toxæmia, for surely this factor can never be eliminated and must play a part more or less in the production of any morbid state. The system is probably in a condition of auto-intoxication whenever it falls a victim even to psychic disturbances. In some of these cases the antecedent history clearly exhibits the presence of some infection—e.g., influenza, dysentery, or toxic state, such as constipation or some other cause of auto-intoxication. In other cases it does not.

As regards the ductless glands, I do not see how it is possible to deny or to prove their influence in this condition. What is the effect of their secretions upon the emotions? What is the influence of the emotions upon their secretions? Suppose the psychic disturbance does lead to some alteration in the glands, to the production, for example, of hyperthyroidism. Are we to suppose that such alteration is the principal result of the shock and that treatment directed to the gland will relieve symptoms? I personally have never seen the slightest benefit derived from this or, for that matter, any other form of treatment.

There is, it seems to me, a great deal to be said in favour of a purely nervous origin. In the first place, a very large proportion of sufferers are of a distinct type of mentality, men with shallow reservoirs of nervous energy—the neurasthenic soil, in fact. I yield to nobody in my admiration of the spirit which has animated the majority of sufferers from "soldier's heart" and all other forms of war neurasthenia when I describe them in this way. The symptoms correspond to a failure in vaso-motor and cardio-inhibitory control. The obstinate resistance to any form of treatment supports the idea of a nervous origin, a shock to the nerve centres which persists who can say for how long. It is a very striking feature that men who sustain a definite somatic injury do not manifest "soldier's heart," nor any other presumably nervous symptoms. In these cases of injury the immunity of the nerve centres to shock may be explained by the dissipation of the shock elsewhere, as the delicate works of a watch are spared in an accident in which the glass is smashed. It may even be explained, without detriment to the hypothesis of neurosis, by the mere circumstance of an injury having occurred satisfying the subconscious with the realisation of something definite, and not presenting to it only the sensation of some vague disturbance, the uncertainty of which prejudices recovery.

Reviewing, with not unnatural pessimism, the persistence of symptoms, one cannot help thinking that only termination of hostilities could cure these sufferers, in whom with the best of intentions there must continue to run a subconscious current of defence-neurosis telling them that recovery means a return to the hell from which they have escaped. Treatment of such cases appears to have the sole effect of perpetuating their neurosis by fixation of the attention, although whether immediate vigorous treatment of them as of purely neurotic origin would yield better results we here have no opportunity of observing. since the cases we see are, so to speak, chronic who are left in *status quo* after a great deal of practically every form of therapy that has been recommended. As we see them, at any rate, such cases are of no further use for general service, but given sedentary work they continue on a low level of activity with the tachycardia and other symptoms unrelieved, but, so far as we can see, executing very light duties with comparative cheerfulness and apparently without any ill effects.

ST. AUSTELL (CORNWALL) BOARD OF GUARDIANS AND THE TREATMENT OF ADENOIDS.—At the last meeting of the St. Austell board of guardians it was decided that Dr. A. Shaw should operate upon children requiring the removal of adenoids at a fee of 1 guinea per patient.

## IMPORTANT PRINCIPLES IN THE DRAINAGE AND TREATMENT OF WOUNDS.

BY WILLIAM PEARSON, F.R.C.S. IREL.,  
MAJOR, R.A.M.C. (TEMP.).

*With Remarks by P. J. FREYER, C.B., Lieutenant-Colonel, I.M.S. (R.), Consulting Surgeon, Eastern Command.*

AN experience of more than two years of war surgery, with considerable study of its literature, has convinced me that no general agreement in the principles of wound treatment has yet been reached amongst surgeons. My time has been spent first in France and subsequently in England, and several thousands of cases have passed through my care, so that I feel I can speak with some authority on the behaviour and progress of various types of wounds in both their early and later stages. This dual experience is, I believe, of value in helping one to form a clear judgment on the merits of different lines of treatment, because it has appeared not infrequently that the views of workers in France and of those in this country are at variance; and it has been suggested that these differences are due to the different conditions under which the work is performed, or rather to the different stages in the life-history of the wounds at which treatment and observations are carried out, so that both may be right, and what is sauce for the goose is *not always* sauce for the gander. I do not believe that this is a satisfactory explanation, as the general lines on which I was working when I left France two years ago are, with slight modifications, those that I still employ with excellent results. The modifications have not been changes of principle, but rather a further advance on the same lines.

Naturally a very large amount of the work and literature on wounds has been devoted to the questions of infection and sepsis and their treatment; and it is not uncommon to hear it said that our ideas on these subjects were previously all wrong, and that we have had to change both ideas and methods entirely. Infection and sepsis are no new things; the differences between them as seen in war wounds and in civil practice are differences of degree and character only, so that if the previous statement is correct it follows that heretofore surgeons have been working on altogether wrong principles in dealing with them. But this is manifestly incorrect, as evidenced by our enormous strides in dealing with intra-abdominal infections, to take only one example. "*Ubi pus, ibi evacua*" is a surgical maxim which is as generally accepted as it is old, and all surgeons are agreed on the necessity for drainage in dealing with sepsis.

### *Claims as to Value of Antiseptics and Concentrated Saline.*

Concerned with this question of drainage are two schools—I had almost said factions—which hold different views as to how drainage may best be aided in subduing infection. The members of one, which may be termed the "antiseptic school," pin their faith to the use of antiseptic solutions by which they believe they can rapidly diminish or destroy the organisms *in situ*, and thus subdue the sepsis and even render the wound sterile. The doctrine of this school amounts to an admission that by drainage alone they are unable to effect satisfactory results—in other words, as I shall indicate presently, that their drainage is faulty or inadequate. The weakness of their position is indicated by the truly astonishing number and variety of antiseptics which have been advocated for this purpose in the medical press of the past two years. From amongst them the hypochlorite group, exemplified by "eusol," may be taken as being the most fashionable at the present time.

The other school, ably led by Colonel Sir Almroth Wright, may be called the "concentrated saline school." It maintains that by antiseptics it is impossible to destroy all organisms in the wound once infection is established short of destroying the tissues themselves, and that infection and sepsis are best combated by promoting free secretion into and discharge from the wound, making use of a concentrated saline solution for this purpose. Whether this acts by osmosis or in some other way is really immaterial to the issue, provided it is effective and necessary. The solution advocated by Sir Almroth Wright is

one of sodium chloride 5 to 10 per cent., and it has been enthusiastically supported by many surgeons both in this form and in its modification known as the "salted pack," which consists of a gauze pack in which are incorporated solids of sodium chloride. While fully appreciating the value of Sir Almroth Wright's work, and recognising that through it he has been demonstrating and emphasising the importance of drainage, the lessons to be learnt by practical surgeons have, I believe, become somewhat obscured by the undue prominence given to the rôle of the concentrated saline, both in his writings and in those of other supporters. Indeed, that this is so was made manifest to me by the remark of a distinguished surgeon, when discussing with me the "salted pack" and advocating its merits a year ago. He said: "It is extraordinary the way it works; it seems to have a remarkable instinct in causing a profuse discharge in the very cases in which it is necessary, and causing very little in others where it is not required." Assuredly, the "remarkable instinct," prompted by the organisms, was exercised by Nature and not by the salt in the pack.

Unfortunately the brilliant advocacy of "concentrated saline," and more recently of "eusol," has possibly done harm. I am convinced that through it, in the minds of many, the main issue has become obscured, and that the paramount importance of good mechanical drainage has been lost sight of. It is, even still, not an uncommon thing to receive a patient, whose wound is in a bad state of sepsis and most inadequately drained, adorned with a label on which one reads, "washed out with concentrated saline twice daily"; "irrigated with Wright's saline every four hours"; "treated with salt packs"; or, "treated with eusol—wounds now beautifully clean." I quote from actual cases received under my own care; the latter case in particular I remember for its cheery optimism, as it was what I would describe as "full of sepsis." I am fully aware of the magnificent surgical work that is being done in France, of the very difficult conditions under which it is often performed, and of the fact that these cases had probably not been dressed for 24 hours when we received them. I only instance them to show that in the minds of some, at least, the value of good mechanical drainage is not fully appreciated, and the use of concentrated saline or the latest fashionable antiseptic is given the *seat of honour*.

#### *Importance of Free Mechanical Drainage.*

Two months' work in France at a base hospital sufficed to convince me that the use, in a wound, of the antiseptics which were then in vogue was valueless in subduing infection at the time when this was the all-important indication for treatment. I became convinced that the secret of success lay in free mechanical drainage; nor have other measures since advocated, and which I have given a fair trial, caused me to change my opinion.

It is, of course, universally agreed that sepsis cannot be dealt with adequately either by antiseptics or concentrated saline if unsupported by drainage; but it is not, I think, generally recognised that wound infection can be thoroughly and efficiently controlled by mechanical drainage without the use of either of these aids in the wound itself. And yet I am convinced that this is so, and that the results are equally prompt and satisfactory. Of such paramount importance is good free mechanical drainage, that when this has been properly established it is a matter of indifference whether we employ antiseptic solutions or concentrated saline as an aid, and the value of either is so subsidiary as to be negligible. I will not assert, as some have done, that they are injurious—I have formed no definite conclusions on this point—but I do say that they are unnecessary. The greater my experience in wound treatment the more I am convinced of the truth of this, both from my own personal observations and from my knowledge of the work (sometimes in an opposite sense) of others. *Mechanical drainage is the essential factor in the successful treatment of infection, and success will be directly proportional to the mechanical efficiency of the drainage.* The question which every surgeon should ask himself, when faced with a case which is not progressing satisfactorily, is, "What is wrong with the drainage system in this wound?" Almost invariably the answer will supply the key to successful treatment, if we exclude, of course, cases of severe systemic infection, gas gangrene, and so on, which fortunately form only a small proportion of our cases. Even these will become greatly

reduced in number by the early establishment of adequate drainage.

Unfortunately we meet here with the difficulty of the personal equation in the surgeon: what one may regard as adequate another may think quite insufficient. But it may help somewhat to state that *what is sufficient drainage in the common infections of civil practice is usually totally inadequate when dealing with a wound infection of similar magnitude*, and that it is impossible to over-drain. Indeed, as a general rule, the freer the incisions the more quickly and satisfactorily is the wound healed, a fact which is not apparent at first sight.

Numerous cases might be quoted where, in spite of weeks of treatment, progress was being retarded or the patient going steadily to the bad from want of mechanically efficient drainage; but it will be more to the purpose to point out the more common faults in drainage as I have observed them. They are: 1. Insufficiently free incisions. 2. Drainage against gravity, without counter-openings, especially in thigh, arm, and shoulder cases. 3. Too small, improperly adjusted, or improperly used drainage-tubes. 4 Mechanical obstructions within the wound, such as small or valvular openings from "pockets," hernial protrusions of lacerated tissue (especially muscle), foreign bodies, bone fragments and débris, tight gauze packs. 5. Obstruction external to the wound, such as tight bandages, pressure from splints, bedding, &c.

In the vast majority of cases the complications and sequelæ of sepsis may be avoided by the institution of timely drainage on sound mechanical principles; and their occurrence should usually be regarded, not as "bad luck," but as an indication that in some way or another the drainage system has been at fault.

#### *Mechanical Principles Involved in Drainage.*

Recognising the paramount importance of drainage, and remembering that from an operative point of view it is merely a mechanical problem, our efforts to render it efficient must be directed in accordance with simple physical laws. Though these are well known, I wish to consider them briefly with special reference to their practical application to projectile wounds. The chief factors governing the efficacy of drainage are then: (1) Absence or reduction of resistance to outflow; (2) gravity; (3) capillary action. The first two of these are closely connected.

1. The freer the exit the less is the resistance offered to the escape of discharges from the wound. This shows the necessity for *free incisions* in dealing with infection, particularly in deep wounds. Our aim should be to convert these into cone-shaped openings, the base of the cone being situated at the surface, so that free exit is obtained from all parts of the wound; pockets and tracks should be thoroughly opened up; "tunnels" should usually be laid open throughout unless anatomical considerations forbid; obstructions within the wound should be removed, so that good access and free exit are established throughout. The necessity for extensive surface openings is *very much greater in the case of infections in projectile wounds than in those of civil practice*, so that it is evident that there is something more than the mere question of free exit involved. The explanation is to be found, I believe, in the nature of the infecting organisms, which usually contain large numbers of anaerobes in the former.

Free drainage in the wound itself will not avail if the outflow is obstructed externally, and therefore attention should always be paid to this matter. Dressings should not be applied tightly, splint pressure must be carefully avoided, and the patient must be disposed in bed in such a way that no pressure is exerted over the wound. These are points which are frequently neglected, and it is difficult in the course of a paper to frame rules for every case. Briefly, however, I may point out that wounds in the posterior surfaces of thigh or leg should be treated by slinging the limb from a Balkan splint or leg cradle; in back and buttock wounds the patient should be placed on a "spinal bed" or framework with removable canvas "slats," so that pressure against the wound may be avoided—failing such an apparatus the patient should be kept in the lateral rather than in the dorsal position; wounds of the upper limb may often be conveniently treated by suspension in a Thomas' knee-splint or from one of the more elaborate devices.

2. The value of gravity and the use of counter-openings as an aid to drainage are not, I think, sufficiently appreciated in practice. This is particularly so in cases of wounds on the front of the thigh with, perhaps, a compound fracture of the femur. In these it is not uncommon to find, even after weeks of treatment, that the only exit is an overflow, that the whole wound is a foul cesspool of pus which has tracked extensively in the limb, and that there is widespread necrosis of the bone and complete absence of union in the fracture. Such a condition can easily be avoided if in the first instance, no matter how free the anterior opening may be, a good counter-opening is made into the deepest part of the wound—preferably, in thigh cases, from the postero-external aspect of the limb.

In extensive wounds with much laceration of tissue it will frequently be necessary to make several counter-openings to deal with different recesses or "pockets," but the surgeon should have a definite purpose in view for each opening he makes; it must never be made by "rule of thumb" but to suit the exigencies of the particular case. The efficient drainage of each individual wound is a problem in itself which should be governed by definite principles indeed, but the details of which depend on the exact characters of the wound. Often it is a simple matter and can be determined at a mere glance; at other times it becomes one of great complexity and cannot be solved without thorough digital exploration and inspection of the wound on the operating-table. Even then anatomical considerations may prevent one from following the most efficient mechanical plan, and one has to adopt something less. But what I wish to emphasize again is that *no other measures which we may employ will adequately replace a mechanically perfect system of drainage.*

3. Capillary action, though of less importance than free exit and gravity, is also a valuable mechanical aid in promoting drainage; it literally "draws" the discharge. In employing gauze wicks and packs for this purpose it is important to observe the following points:—

(a) The gauze should extend into the various parts of the wound, which should be filled up evenly and with but moderate pressure throughout; it should constitute what I term a gauze "fluff," and not a tight pack.

(b) Dead spaces should not be left within the gauze or between the gauze and the walls of the wound, as they will favour stagnation and decomposition of the discharge and form an excellent culture-ground for bacteria.

(c) In order to maintain capillary action it is necessary to prevent water-logging of the gauze drain. Hence we should allow evaporation to take place, and should never employ a waterproof covering over the dressing during the period of profuse discharge. For this reason, too, external dressings of gauze will be much better than close substances such as lint. The time-honoured boric fomentation is to be vehemently condemned at this stage, as it rapidly becomes merely a pus poultice, but unfortunately its use is still common. Copious coverings of wool and the application of firm, heavy bandages should similarly be avoided except for purposes of transit. The use of large quantities of wool for the purpose of soaking discharge should also be condemned on grounds of economy, as much of the wool now in use is anything but absorbent, and discharges merely track along inside the dressing to find their escape in the bedclothes. If the external gauze dressings become saturated they should be changed immediately.

(d) It is in the acute virulent stage of infection, when the discharge is usually profuse and serous in character, that capillary action is an effective aid to drainage; it is of no value when discharge is thick and purulent. If gauze packs are used then, and if discharge is profuse, they become clogged with secretion in a short time, and acting as foreign bodies merely delay the cleansing of the wound. This does not mean that gauze packs should never be employed in the later stages of wound treatment. They have very important uses then, too, but chiefly not for drainage purposes. Space does not permit of dealing with these uses here.

Incidentally I may remark that if a wound is thoroughly cleansed of foreign material and dead tissue and efficiently drained on the lines indicated, the change in character of the discharge from thin serous to thick purulent is accompanied by such a diminution in amount that there is no stage in which we find a profuse purulent secretion. The

occurrence, and particularly the persistence of the latter, should always lead one to suspect either a foreign body, dead tissue (especially bone), or defective drainage. Indeed, many flesh wounds treated on these lines clean up rapidly within a week, so that it is difficult to say that there has been any purulent stage, and they may readily be closed by secondary suture or strapping with adhesive plaster.

#### *Aids to Mechanical Drainage.*

1. *Uses and abuses of drainage-tubes.*—A drainage-tube should be employed where a dead space cannot be avoided by gauze packing, or where dead tissue is present whose complete removal is inadvisable during the early stages of infection (e.g., most compound fractures), so that a prolonged period of free discharge is anticipated. The tube should lead down to this point, and it may often lie conveniently in the midst of the gauze packing, so that it does not come into contact with the walls of the wound. It must, however, act in the direction of gravity, if possible—through a counter-opening, if necessary. Through the tube a gauze wick may be introduced with advantage while the discharge is serous in character. Occasionally it is useful to keep both tube and wick long, so that they project for some distance from the wound and in this way exert an increased syphonage or suction action on the discharge and convey it to a convenient receptacle.

In deep wounds where neither dead space nor necrotic tissue exists, but where the escape of discharge is in an upward direction, a tube should be led through a dependent counter-opening into the deepest part; or the wound may be enlarged in such manner that gravity no longer hinders but will favour drainage. Where neither measure is feasible a tube should be led directly through the wound to its deepest part, and through it discharge should be aspirated as it accumulates.

Tubes are also useful for purposes of irrigation in deeper parts, particularly in comminuted fractures with necrosis, where there is always some tendency to retention and decomposition of discharge between the bony fragments. Here, unless the exit is exceptionally free, it is convenient to employ two tubes—one for injection and the other for return of the fluid. These may lie side by side (the "doubled-barrelled" tube) in the wound down to the fracture, but are often more efficacious when introduced from opposite sides—one through a counter-opening. In this way accumulated stale discharge can be washed away thoroughly at frequent intervals.

Another use for drainage-tubes, apart from treating infection, is in maintaining the patency of openings in the soft tissues when they show a tendency to close too quickly to permit of sound healing in a deeper part. Examples of this in connexion with bone cavities of moderate size, after necrosis has been eradicated, will not infrequently occur and need not be alluded to further.

Care must always be taken to select, trim, and insert a drainage-tube to suit the particular requirements of the case. Within limits, the larger the bore of the tube the better. The tube should be introduced *down* to the area to be drained, but *not through it*—the importance of this has been previously pointed out by Colonel H. M. W. Gray.<sup>1</sup> Great care must be exercised to prevent the end-opening of the tube from being occluded by contact with tissue, and a useful method to prevent this is to cut it in a "fish-tail" manner. Superfluous side openings should never be used, and the practice of employing tubes in which these have been made previously haphazard by the theatre sister is to be condemned. When cutting a side opening there should always be some definite purpose in view, such as the escape of discharge from some more superficial plane or area, and it should be placed accurately at such level and in such direction as will ensure its efficiency. It is common to meet with cases of through-and-through wounds of the thigh, arm, or leg, with considerable laceration of muscles and a severe comminuted fracture in which the only attempt at drainage has been the insertion of one long drainage-tube right through the limb and fracture, with a few lateral openings cut anywhere and lying anyhow up against the walls of the wound. This plan is never efficient, and should not be adopted.

The danger of pressure necrosis from a drainage-tube must always be remembered. For this reason tubes must

never be a "tight fit," either a smaller tube must be used, or, more frequently, the opening should be enlarged. It is always advisable during the acute stages of infection to insert gauze between the tube and the surrounding tissues. On no account should a drainage-tube be left in contact with the wall of a blood-vessel; otherwise secondary haemorrhage is almost a certainty. Contact with nerves, ducts, and other important anatomical structures should also be avoided.

Superfluous drainage-tubes should not be employed, and as soon as a drainage-tube has fulfilled its functions it should be discarded. It may seem unnecessary to say this, and yet there appears to be an idea amongst many that a drainage-tube in a septic wound, even if it is not doing much good, is at any rate not doing any harm. There comes a time in the treatment of every wound when the retention of a drainage-tube is doing harm: a tube is at all times a foreign body, and thus its presence is injurious unless the advantages derived from it outweigh its disadvantages. Its primary use in infections is to maintain a free exit for discharges until the infection has been subdued sufficiently to enable us to dispense with it. Its presence may retard as well as favour healing. More than once I have seen a tube retained in a long narrow track which for weeks past had been "crying out" to be allowed to close, and the removal of the tube resulted in complete healing in a few days.

**2. Exposure to air.**—The advantages of loose dressings and their exposure to the air to prevent saturation and stagnation of discharge and to favour drainage by capillary action have been mentioned already; but exposure of the wound itself is sometimes of special value.

In the early stages of severe infection, when first a wound has been opened up, I have sometimes found it advantageous merely to cover the wound with one or two thin layers of gauze, which are laid *evenly in contact with the surface all over*, and to use a bed of dressings on to which the discharge runs. This is best suited to widely gaping or open wounds such as the raw ends of septic "chopped-off" amputation stumps, and I know no method by which they clean up and become covered with healthy granulations more quickly. Presumably, in addition to the continuous and thorough removal of all discharges, this method has the advantage of combating anaerobic infection very effectively, and I have termed it the "local open-air treatment." I frequently adopt this method also for a few days in the later stages of treatment as a preliminary to secondary suture and skin-grafting, and I believe it is of real value.

**3. Irrigation.**—Continuous irrigation has been recommended by many, and is undoubtedly a means of effecting a constant removal of waste products. But it is at best in most cases a troublesome method to carry out; it is impracticable when dealing with large numbers of patients, and I do not think it yields better results than *good mechanical drainage* without its aid. For these reasons I have rarely employed it. Irrigation of the wound should, however, be performed when packs are being changed, as it not only helps to loosen the latter, but also removes any residual discharge and "floating" organisms. It is also useful for washing away discharge at intervals from areas which otherwise cannot be thoroughly drained (e.g., between bone fragments).

**4. Use of concentrated solutions of salts.**—Sufficient has been said before to indicate that I do not believe in the efficacy of this method. When drainage is carried out on proper mechanical lines it is quite unnecessary, and I cannot satisfy myself that it either increases the discharge or hastens cleansing of the wound. And here I must allude to an admirable paper by Captain J. E. H. Roberts and Captain R. S. S. Statham on "The Salt Pack Treatment of Infected Gunshot Wounds."<sup>2</sup> It is certainly the best paper I have read on the general treatment of wounds, and I can readily credit the excellence they claim for their results. But I think they have been unfortunate in the title of their paper and that they attribute their success rather to the wrong quarter. Their methods of drainage are very similar indeed to those which I have advocated here, and which I have employed now for two years, and I am convinced that their results will be equally good if they abandon the use of the salt in their packs.

**5. Administration of fluids to the patient.**—The discharge from a wound which is its natural irrigant is derived from the body fluids. When the discharge is profuse these fluids will rapidly become depleted and the discharge will diminish, and the elimination of waste products and toxins by the kidneys will be reduced unless we maintain the source of supply. Herein lies the value of the free administration of fluids in cases of severe sepsis.

The late Dr. J. B. Murphy, of Chicago, clearly recognised this in advocating proctoclysis in the treatment of general peritonitis, and he suggested that its mode of action in producing a natural irrigation of the peritoneal cavity was by transference of fluid from the lumen of the bowel to the lymphatics, thereby causing a "reversal of the lymph flow in the peritoneum, so that the latter became a secreting and not an absorbing membrane." But it is surely more probable that the "reversal of the lymph flow" is merely the natural protective inflammatory exudate, which is *maintained and increased* by sustaining the body fluids to the full. In this way we see the application of the principle of fluid administration to all cases of infection as an aid to drainage. In severe cases with marked toxæmia, where shock or much loss of blood may be anticipated at operation or where very profuse discharge is to be expected afterwards, saline infusions should be given on the operating table and rectal salines should be administered subsequently; in less severe cases rectal salines alone will suffice. In all cases the patient should be allowed unlimited fluids by the mouth, provided the stomach will tolerate them. The free exhibition of fluids will largely prevent or remove the pinched, shrivelled look of severe sepsis; it will give the patient a general feeling of well-being, it will allay the appalling thirst, and it will maintain a free discharge from the wound until the infection is subdued.

#### *Uses of Antiseptics in Wound Treatment.*

Personally, I consider antiseptics valueless as a means of disinfecting a wound once infection has become established, but nevertheless they have their uses in wound treatment. They prevent stale discharges from becoming a breeding ground for bacteria, and so diminish the risk of infection spreading or being conveyed from one wound to another. Consequently they should be employed in the gauze dressings into which the wound drains, and should also be used in irrigating lotions. Soiled dressings should be placed in a receptacle containing some antiseptic solution when they cannot be burnt immediately. It matters little or nothing what antiseptic is employed, provided it is cheap and efficient and has no particular disadvantage; substances irritating to the skin, such as mercurial salts, should be avoided in the dressings. For irrigation I prefer a lotion containing peroxide of hydrogen, as it possesses special mechanical properties in loosening dressings and packs and in removing débris from the wound.

In the later stages of wound treatment antiseptics may be put to many uses to promote healing. But they are employed then, not for their antiseptic properties, but rather as caustics, astringents, or stimulants to control and direct the growth of granulation tissue in proper directions—a process which may be termed "coaxing the wound."

#### *Vaccines.*

Like most observers, I have not found vaccines helpful in dealing with infections in wounds of war. Perhaps the type of case in which resort to them is still most frequent is one of chronic sinus which has obstinately refused to heal. I believe that in every case of persistent sinus the obstacle to healing is *local and mechanical*—a sequestrum or focus of caries, a foreign body, drainage against gravity, too small a surface opening, callous rigid walls, or degenerated granulation tissue—and that the correct treatment is to deal with it accordingly. I know of one case in which a sinus persisted for nearly a year following a simple flesh wound in a limb. Eventually the surgeon was about to resort to vaccines, but a skiagram revealed the presence of a bullet in the muscles.

#### *Rest.*

The importance of maintaining the injured part at rest has been previously emphasised by other writers, and therefore needs only passing reference here.

*Removal of Loose Bone Fragments.*

Differences of opinion have been expressed as to the removal of loose fragments in the early stages from a septic comminuted fracture in view of the danger of non-union. I think the general tendency has been towards insufficient removal and that the danger of non-union is over-rated. In these cases we meet with three types of fragments which, according to their size, may conveniently be termed "fragments" proper, "gravel," and "sand." "Gravel" and "sand" should always be removed as thoroughly as possible; they merely form masses of necrotic débris in which discharge stagnates and organisms flourish. "Fragments" proper should be removed when they retain no connexion with periosteum and soft parts, as they are then avascular and completely necrotic. Fragments which retain their vascular attachments may be left *in situ*, provided that their presence does not impede free mechanical drainage, especially from the medullary cavity. Only one case of non-union has occurred in hundreds so treated.

*Complications of Wound Healing.*

I desire briefly to allude to two of the most important complications which one meets in dealing with wounds:—

1. *Deformities from muscular contractures.*—Muscles which are the seat of inflammation are liable to become permanently shortened, and so to lead to crippling deformities, especially in the limbs. Such deformities are usually easy to prevent but difficult to cure. Consequently we should guard against them from the start, and maintain the limb in suitable position. Contraction of the hamstrings with permanent flexion of the knee, and of the calf muscles with drop foot, are amongst the most important; corresponding conditions may occur in the upper limb. If injury to muscles is likely to impair or destroy the mobility of a neighbouring joint, the joint must be kept in the position in which it will be of the greatest use subsequently.

2. *Secondary haemorrhage.*—This is almost invariably an indication that the drainage of a wound is faulty. Consequently it should not occur subsequently to operative treatment for infection, and it will practically disappear if we effect adequate mechanical drainage in the early stages. When it has occurred the case must be submitted to operation without delay, otherwise recurrence is a practical certainty. In every case where it is anatomically possible the wound should be explored and the source of bleeding found and dealt with directly by ligation of the vessel on both sides of the erosion, choosing a healthy part of the vessel wall. Faults in drainage should also be rectified at the same time. Packs and such measures should only be used as immediate temporary means of control; they lead to a false sense of security and are often ineffective in controlling the bleeding. Turpentine I regard as useless and even dangerous, as it may lead to increased sloughing in the tissues. Proximal ligation at some distance from the wound should never be adopted where direct treatment is possible; it may fail to control the bleeding primarily, and it is no safeguard against recurrence.

Subsequently to operation secondary haemorrhage has, in my experience, been remarkably rare. It has only occurred in four cases—i.e., 0·25 per cent.—and I attribute this entirely to the methods of drainage employed. These cases are instructive as showing the cause of the haemorrhage. In the first case, which occurred early in the series, the posterior tibial vessels yielded behind the lower end of the tibia, probably from the pressure of a drainage-tube. This is the only fatality I have had from haemorrhage; the patient never rallied and died in less than two hours. In the second case, at operation for extraction of shell from a deep lacerated septic wound in the middle of the thigh received some ten days before admission and in which drainage was against gravity, the femoral artery was felt pulsating in the wall of the wound. The question of ligature was considered and rejected, but the vessel gave way 36 hours later. In the third case the brachial artery was perforated some three weeks after operation by a projecting spicule of bone on the upper fragment of the humerus, which was comminuted in its upper third. The fourth case was a difficult one of comminuted fracture of the lower third of the humerus with severe infection, in which anatomical considerations prevented adequate drainage in the direction of gravity. Here the ulnar artery yielded in the antecubital fossa.

I have operated on some 15 other cases for secondary haemorrhage, and in each there were obvious mechanical faults in the drainage.

All cases (except that first quoted, where the patient was moribund when haemorrhage was controlled) have been treated by direct ligation on the lines indicated. In none was there any recurrence of haemorrhage and all patients made good recoveries.

The opinions expressed in this paper are the results of close personal observation and practice of war surgery extending now over a period of more than two years, and I believe that a more general recognition of the principles advocated, with their thorough application to all cases of infected wounds in their early stages, will help materially to improve our results and hasten the recovery of our patients. That good results can be obtained by these methods the following brief facts will, I think, bear witness:—

1. Out of all cases treated there has been only one death from sepsis. This was a very severe compound fracture of the upper end of the femur; the patient was already overcome with toxæmia when received, amputation was not practicable, and death occurred on the following day.

2. There was one death from gas gangrene, which developed rapidly in the upper half of the thigh. A high "guillotine" amputation was immediately performed, but it was impossible to get beyond the infected area.

3. Apart from three other cases of gas gangrene, in which amputation was successfully performed, only four amputations—all successful—have been done to save life. Three of these patients had been wounded some considerable time before coming under my care; the fourth had been literally riddled, and 22 shrapnel balls had been extracted (at three sittings) before it became necessary to amputate through a knee-joint eight days after he had been wounded.

It is questionable whether some of the limbs saved were worth preserving from a functional point of view, but this does not affect the results.

4. Two cases of tetanus occurred and both patients recovered under treatment.

*Conclusions.*

1. Efficient mechanical drainage is the essential factor in the successful treatment of infection.

2. The cardinal principles governing drainage are: Freedom of exit; gravity; capillary action.

3. Drainage-tubes should not be employed unnecessarily. They should effect the purposes for which they are used, and should not act injuriously in the wound.

4. Dressings should not be tight, of close texture, or waterproof. They should be exposed to the air while discharge is profuse.

5. Continuous irrigation aids disinfection by mechanical removal of discharge. It is usually not feasible when dealing with large numbers of cases. It is not necessary in order to obtain good results.

6. Free administration of fluids to the patient is an important adjunct in the treatment of sepsis.

7. The value of concentrated saline solutions and antisepsics as aids to disinfection is doubtful and negligible.

8. The use of salines and antisepsics in no way diminishes the necessity for free mechanical drainage.

9. Vaccines are not helpful in dealing with infections in wounds of war.

10. Rest is an important factor in wound treatment and should never be neglected.

11. Most of the complications and sequelæ of infection are due primarily to inefficient mechanical drainage, and are therefore preventable.

12. Delay in healing is almost invariably due to local mechanical causes.

My best thanks are due to Lieutenant-Colonel P. J. Freyer for the interest he has taken in my work and the kind remarks he has made on my paper.

*Remarks by Lieutenant-Colonel P. J. FREYER.*

Major William Pearson has invited me, as consulting surgeon to the Eastern Command, and therefore intimately associated with him in the work of the large war hospital to which he is surgically attached, to offer some observations on his paper on "Important Principles in the Drainage and Treatment of Wounds." Whilst readily complying with his request, my observations will be brief, for the simple reason that I entirely endorse the views enunciated by him, and

that anything I might say on the subject has already been simply, clearly, and forcibly expressed in this essay.

As my mission in this war has been mainly consultative, and only to a minor degree operative, I have had ample opportunities in passing under review tens of thousands of wounds of all types and degrees and of comparing the methods and results of other surgeons, many of them amongst the ablest in the profession, and all actuated by the desire to place at the disposal of their patients what they considered the best methods of treatment. The "supersaline" treatment with its paraphernalia was much in vogue in the early days of the war, but has been gradually disappearing from the stage. Antiseptics innumerable have, of course, been employed, and successfully employed, I have noticed, in proportion to the adequacy of the accompanying drainage. At my first visit to Major Pearson's wards, containing some 500 beds, I was much struck by the simplicity of the dressings and the thorough mechanical drainage of the wounds. Each subsequent visit confirmed me in my admiration of the surgical methods employed and the results obtained therefrom. I can honestly say that I have never seen better surgical work than that accomplished by the simple methods described in this paper.

## THE INFLUENZA EPIDEMIC OF SPRING, 1915; WITH SPECIAL REFERENCE TO ANOMALOUS THROAT SIGNS.

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### Introductory.

THIS paper is a résumé of observations on some 500 cases of influenza in civil practice in South London, occurring about two years ago; time having hitherto been otherwise occupied, these observations could not be sent to the press until now. At the end of 1916 we were faced with the same perennial visitor, and to demonstrate its vagaries this paper should make possible a comparison between the syndrome of spring, 1915, and that of the last months of 1916.

It must primarily be remembered that the influenza germ is certainly responsible for a variety of lesions, dissimilar in almost every epidemic and in almost every locality, yet retaining certain common traits. For instance, the older physician scarcely recognises the modern type of influenza as his old friend the "knock-me-down fever," and therefore is apt to overlook it, if not to despise it as unworthy of much attention. Yet I venture to state, and herein hope to show, that the clinical and bacteriological phenomena associated with this complaint are a study worthy of much attention and as yet largely unfathomed, in spite of the enormous literature on the subject.

At the onset I wish to state that although the cases of the present epidemic appear to be rather more severe, they present many of the phenomena which I am about to describe.

### General Description.

Adopting the older classification of catarrhal, nervous, and abdominal types, one could describe the cases of the 1915 epidemic as partaking of a combined catarrhal and nervous type. The abdominal type was almost completely absent. All these cases presented in the first stages a vesicular eruption on the soft palate, fauces, and posterior pharyngeal wall, with erythema of the mucous membrane, and were generally followed by neuralgias or other nervous phenomena. The initial symptoms were mild, but complications were frequent and varied. The catarrh was protracted and the nervous system slow in resuming its normal tone.

To sum up, one might describe the syndrome as a febrile catarrh with a secondary neurotoxic lesion as its most prominent complication. Later statistics will be given and these lesions classified. Before going further it will be well to have a clear clinical picture.

A typical case was that of a man, aged 25, a smoker. The patient was in contact with several folk afflicted in this

epidemic. At first he had a feeling of malaise, with muscular pains in the limbs, especially the thighs, also frontal headache and disinclination for work. That evening his temperature was 101° F. and pulse 72. The urine was febrile. He had, the day before, noted an abundant pharyngeal catarrh, so abundant that he was continually expectorating mucus. He complained of a sore throat and had some conjunctival injection.

*Examination of the throat* showed an erythematous patch of a dark red colour on the right side of the soft palate and uvula, which was in this case unilateral, ceasing abruptly at the middle line. Upon this erythematous patch were seen about half a dozen almost transparent vesicles, about the size of a pin's head, whose base was faintly reddened. More could be seen on that part of the soft palate where there was no erythema. The vesicles were quite firm to touch. There were vesicles also on the posterior pharyngeal wall and also some granulations. There were no adenoids or tonsils to speak of.

There was no anterior nasal coryza. The soft palate was definitely tender to touch, and neuralgia was complained of in the teeth on the right side.

The temperature was down next morning, but there were still headache and "shivering feelings" in the back. In a day or two, the mucous discharge had ceased, but the throat was extremely sore for a week or more and the remissions lasted for a month. The general symptoms subsided in three days, but the vesicles recurred for three weeks or more—i.e., as long as the throat was sore. Even exposure to a cold wind would cause their reappearance after apparent subsidence. Beyond a general nervous debility the case was free from complications. After four to six weeks the hypotonia gradually wore off, with complete recovery.

Bacteriological examinations were kindly made for me by Dr. W. E. Kingdon, of Sheffield University. Cultures from the vesicles were made on haemoglobin media and stained for influenza. Only staphylococci and streptococci were found. True influenza bacilli were obtained by myself earlier from the mucous discharge on the posterior pharyngeal wall, but could only be obtained quite early in the disease.

The above somewhat, but I hope not unduly, detailed description represents a fairly typical case. Whilst the age and sex incidence was not in any way restricted, as a general rule youth and middle-age suffered most.

### Analysis of Syndrome.

Analysis of the syndrome (group of symptoms) falls under four headings, and will be illustrated:—(1) The severity of the initial coryza; (2) the erythema and persistent vesicles in the throat; (3) the sequential neuralgias; (4) the variety of complications.

1. *The severity of the initial coryza.*—In the above quoted case the flow of thin mucus was so severe that it was impossible for the patient to smoke at all, and he was compelled to expectorate large quantities of mucus and saliva. At night he was kept awake by a troublesome hawking. It may be important to note that almost always the cough was relieved by small doses of morphia, this suggesting a nervous origin, in part.

In another case, a male aged 72, who had had cerebral haemorrhage about five years before, was so troubled with coryza that the strain of expectoration brought on epistaxis, which could only be controlled by firm nasal tamponage.

An infant, aged 10 months, was continually salivating and coughing for three days, with much vomiting, showing the excess of mucus had been swallowed.

In another patient continual hawking and expectoration brought on a subconjunctival ecchymosis.

In a pregnant woman, aged 38, the expectoration caused an abdominal muscular rupture.

Such examples are sufficient to demonstrate this very unpleasant symptom.

2. *The erythema and vesicular eruption.*—This complex is largely the *raison d'être* of this paper. In no case examined with a typical influenza syndrome did I fail to find this clinical picture. Also it should be noted that in only one case was there an eruption (and that herpiform, and on a mucous surface, the lips) found elsewhere on the body.

Numbers of patients came up complaining of sore-throat, which they found difficult to get rid of, of 10 days' duration or more, and no other symptoms save slight malaise. Examination of the soft palate, uvula, and posterior pharyngeal wall invariably showed some vesicles about the size of a pin's head, and nearly always accompanied by erythema.

Others came up complaining of facial or orbital neuralgia but no sore-throat. Examination of such cases revealed the same clinical picture; in fact, this throat syndrome one found pathognomonic in this particular epidemic of influenza.

One rather puzzling case of what was apparently influenzal neuralgia, where one expected to find vesicles and erythema,

showed none. After the customary irrelevant excursions it appeared that the patient, aged 22, a woman, had suffered from neuralgia for several years. It was a typical case of neuralgia quinti major, for which she had had many dental operations. Here the exception proved the rule.

Discussion as to the etiology of this condition—namely, the erythema and vesicles—will be given later.

3. *The sequential neuralgias.*—Although almost invariably the neurotoxic effects were sensory, one of seventh nerve palsy was observed. This occurred in a man aged 45. There was no history of otitis media, but insanity had occurred in his brother. The lesion was unilateral and had all the characteristics of the lower motor neurone type. The patient slowly recovered, almost completely. He had a typical vesicular throat, which persisted some three to four weeks. The general disturbance was nil.

In the main, however, the neurotoxic effects fall most heavily upon the sensory nerves, and may be classified thus: A. Pain in the palate and fauces ("sore-throat") due to affection of the palatine and naso-palatine nerves, i.e., fifth root. B. Pharyngeal (pain on swallowing), i.e., ninth root. C. Facial neuralgia, i.e., fifth root. D. Orbital neuralgia, i.e., fifth root. E. Frontal neuralgia, i.e., fifth root. F. Aural neuralgia, with or without vertigo, due to affection of the fifth, seventh, or eighth nerves (the seventh only if exposed).

Severe otalgia, certainly not due to an exposed seventh nerve, except in one case, was quite frequent. It required morphin at times, but rarely preceded a true otitis media of the suppurative variety. Usually it subsided, showing only intense injection of the tympanic membrane. Trifacial neuralgia of a mild type was common, also orbital and frontal neuralgias, both with and without conjunctivitis.

4. *The variety of complications.*—An almost universal feature was nervous debility with a disinclination for food—and for work. Acute prostration was the exception, but one case was thought to be typhoid fever for a short time. Otitis media has been mentioned. Two cases of appendicitis were noted. Herpes of the lips, apart from pneumonia, occurred twice, and there were several cases of persistent sweating on slight exertion. Nervous debility on two occasions merged into melancholia of a mild type. A case of epistaxis in an old man has been mentioned.

It will be convenient at this point to give the actual statistics:—

Cases of undoubted influenza	514
Cases whose throats were examined	456
Percentage of these with typical throat signs	100%
Mortality	0·3%
Percentage of all cases with complications	42·0%
<i>Persistent Neuralgias</i> (i.e., over 48 hours duration).	
Frontal	27·3
Facial	18·2
Orbital	15·7
Aural	13·8
Vertigo	6·9
	100·0
 <i>Other Neurotoxic Complications</i>	
Seventh nerve paralysis	0·2
Herpes of lips	0·2
Persistent sweating	3·0
Melancholia	0·4
Conjunctivitis	4·0
Unclassified complications	10·3

#### Hypotheses as to Mode of Origin of Erythema and Vesicles, with Review of Supposed Mode of Infection.

1. That the vesicles are the accumulated secretion of inflamed mucous glands. A study of the anatomy of the soft palate and surrounding structures reveals large numbers of mucous glands. Whereas these glands no doubt share the toxic effect, the vesicles are quite firm to the touch and resistant, unlike a mere retention-cyst of mucus. Finally the glands are innumerable, but the vesicles few.

2. That the vesicles are part of the clinical picture of aphthous stomatitis. Aphthous stomatitis according to Taylor, is not common in adults. It consists of circular grey patches appearing on the gums about the first dentition, on the tongue, and inside the lips and cheeks. They have the appearance of vesicles which subsequently ulcerate. They are said to consist of a fibrinous exudate beneath the epithelium. They heal in a few days, but may recur. In adults they are far less numerous than in sickly children in whom they are most common. Such a description tallies well with our clinical picture, but for two discrepancies. The erythematous vesicles never appear on the tongue, lips, or cheeks. Moreover, they never ulcerate.

3. That the lesions are caused by an epizootic ("pink eye") transferred to man from certain lower animals. This hypothesis should not be confused with the one which claims that influenza in horses (or other animals) is identical with human influenza. Inoculation experiments have disproved this, for human influenza is not inoculable on animals, or at any rate the human syndrome, as the older

practitioner knows it, is not reproduced. In monkeys some degree of toxicity obtains, but horses are immune. Many writers interpret this as meaning that equine influenza is not communicable to man. Personally I do not see the force of this argument. Until man has been inoculated with equine influenza, who is at liberty to assert that such inoculation will prove abortive? Yet such is the orthodox opinion of to-day. There seems to me no inherent reason why man should not be susceptible to both the equine and human varieties. The history of influenza points to this. Horse-breeders are convinced of its probability. It will, therefore, not be out of place to review two pieces of evidence.

According to Hopkirk, who has studied the history of influenza very carefully, the earliest instance of supposed influenza occurred during the tenth year of the siege of Troy, affecting the Grecian camp. It was very fatal, if it was influenza.

In 1404, Babilonius reports an epizootic of low mortality amongst men.

In 1410-11, in the Paris epidemic, there was an epizootic amongst birds.

In 1562 there was a characteristic outbreak in the British Isles, then called "The acquaintance." "It is a Payne in their heads that have it, and a soreness in their stomaches, with a great cough. It remayneth with some longer, with others shorter tyme, as yt findeth apt bodies. The Queen kept her bedde six dayes. There was no appearance of danger, not manys die except some old folks," so writes Queen Elizabeth's ambassador at the Court of Mary, Queen of Scots.

In 1889-90, in the respiratory type, we note "redness and swelling of pharyngeal mucous membrane, with increased secretion, often followed by laryngitis and conjunctivitis with photophobia. Neuralgia of the fifth nerve was common.

Along with these manifestations which closely resemble, in one respect or another, our syndrome, it was noted that cows and horses suffered in 1733, 1737, 1803, 1831, 1837, and 1915. Also dogs, cats, deer, sheep, swine, poultry, and fish had contemporaneous epizootics on these occasions. It is improbable that on all these occasions when influenza was raging (and can anyone recollect a year when it was not?) that these epizootics were anything to do with the human disease, but they may have been in some instances, and their occurrence is noteworthy.

As regards 1915, concerning the connexion between "pink-eye," mentioned by Goodhart in Allbutt and Rolleston's "System," Mr. C. Sorby Straw, of Streatham, who has owned and bred horses for many years, states that "he believes that 'pink-eye' is really influenza, the 'membranes' become very red. It starts with a chill, they run at the nose, have sore throats, and sometimes end by being broken-winded. Isolation is rigorously carried out." Mr. Straw's son in the Territorial Yeomanry fully believes he contracted laryngitis from "pink-eye" in his horse. Pink-eye was very rife in many camps, so was influenza.

Is there anything in medicine resembling this? Assuredly, we know bovine tuberculosis, or, better, glanders and anthrax. These are epizootics having a slightly different syndrome in man compared with their zoological appearances. It therefore behoves us not lightly to dismiss an influenza case of an atypical nature as impossible of equine origin, although we cannot prove equine origin until some man has been inoculated with "pink-eye."

4. That the lesions are identical with herpes zoster. Herpes zoster is defined by Henry Head as "vesicles on an erythematous base." It will be worth our while to study this affection.

It must not be confused with herpes febrilis. The former rarely recurs, the latter habitually. Zoster is rarely bilateral, febrilis is generally found thus. A definite nerve area is affected in the former, not so in the latter. Central degenerative changes are to be found in herpes zoster, not so in herpes febrilis. The two may coincide. The optimum age-incidence for zoster is 4-13. It tends to occur in epidemics, but they are not easy to trace.

*Acute specific zoster* is analogous to anterior polio-myelitis. Inflammation or haemorrhage of the posterior root ganglion is found. These cells, it is interesting to note, are the morphological equivalents of the anterior horn cells.

In 1896, 1897, and 1898 epidemics occurred in March, May, June, and July, and up to October. Atmospheric conditions and intercurrent disease—e.g., measles, diarrhoea, pulmonary tubercle, arsenical poisoning, dementia paralytica, and other mental diseases—were said to have been etiological factors. Acute lobar pneumonia as a cause is well known.

*Symptomatic zoster* occurs in tabes dorsalis, myelitis, caries and necrosis of ribs, sarcomata, especially those invading ganglia, caries of the spine, and cerebro-spinal

meningitis. It is purely secondary and symptomatic and not of interest in this connexion.

The pathology of these lesions is, however, significant. Marchi's method shows the slow, degenerative changes excellently. The lesions in the central nervous system are haemorrhage into the ganglia in acute cases, with secondary degenerative changes in the posterior roots and their peripheral nerves.

The symptoms are; malaise, a temperature not greater than 100° F., and shooting pains in the affected regions; so severe are they in herpes intercostalis that this has been diagnosed pleurisy or pneumonia. The pyrexia lasts two or three days and the rash only appears on the third or fourth day. Small gangrenous patches on the skin may occur. Hyperesthesia and deficient thermotactic sensation are known as common sequelæ.

Herpes febrilis is but a special name for pneumonic herpes. Herpes of the soft palate is often bilateral. It is not difficult to see many essential differences between these signs and symptoms and those of the syndrome under consideration.

Of the pathology we can compare little. In true human influenza haemorrhagic lesions are well known. Our lesions, possibly similar, were too transient to be so severe as to be mistaken for either typical nervous, old-fashioned "flu," or for typical zoster. Intercurrent disease hardly played any part. The pain at no time was severe and the rash appeared at the outset. Ulceration was never seen, nor was there anaesthesia.

Therefore we may confidently assert that our syndrome was distinct from that of herpes zoster.

Boylan, Heller, Hutchinson, and Hall have reported on pharyngeal herpes, a rare complaint, but none of them give any instances of "contagium vivum" as a cause. Other writers—e.g., H. F. Parsons and Sadler—have referred to cases of epidemic herpes, which were always cutaneous, and therefore irrelevant in this case. Frederick Taylor refers to certain "aberrant vesicles" in herpes. He does not, however, give their site of election, nor discuss their etiology.

Semon, in Allbutt's "System" describes two varieties of "angina herpetica," or herpes pharyngis. The first is comparable to herpes febrilis, the second to herpes zoster. The first has a grave prognosis, the second is painless, afibrile, and recurrent. Wherefore both are irrelevant to us.

5. This leads to consideration of the final suggestion—to wit, that the eruption, although clinically similar to herpes zoster, is, in reality, due to an influenzal intoxication of centripetal diffusion (of tetanus). There was no question but that these were cases of influenza. Their symptoms can be traced all through history, with one exception, yet the throat lesion was invariably present. The *modus operandi*, however, is not clear. Granting that the lesions were herpetic, let us revert to the anatomy of the sensory nerves. Anatomy shows that the sphenopalatine ganglion and its branches connect up with otic, Gasserian, geniculate, and sympathetic ganglia. This implies a possible path for intoxication of their neurones. Neuralgia of the face, teeth, orbit, frontal regions, and throat are conceivably to be explained as toxic neuroses of these ganglia and neurones. Infection is, in the last analysis, intoxication. The process may have started in the palatine branches, and thence spread centripetally, after the fashion of the tetanus toxin. But for all that there were no influenza bacilli to be grown from the vesicles. Even so, they were present in the contiguous sputum, and secondary influenzal lesions generally only contain staphylococci and streptococci. *Faute de mieux*, this hypothesis is the one to which I pin my faith. Nevertheless, I realise that the pathological basis upon which it rests requires further consideration. I am prepared to go further and admit that the hypothesis is largely the product of induction, nevertheless I believe that the train of reason which led to it will bear the test of logic. The inductive method is copied from good sources. It led Charles Darwin to the theory of evolution.

#### *Conclusions.*

The influenza toxin spreads centripetally along the sensory nerve tracts, expending itself on the first footholds—i.e., pharyngeal mucosa and its substructures—and thence passes to the palatine nerves. The effect of the virus is inflammatory; on a mucous surface it causes a vesicular eruption ("vesicular neuritis"), whilst deeper down it causes similar inflammatory changes, giving rise to pain.

The virus spreads far into the central nervous system, even poisoning the vagal or sympathetic nerves. Tachycardia and bradycardia are well-known sequelæ. The cerebrum shows

the aftermath of influenza in a varied and sometimes to a sinister degree. The epidemic of spring, 1915, in London conceivably had an equine origin, not conversely, for human influenza cannot affect horses. That the syndrome occurred elsewhere is not unlikely. Military cases seen as late as February, 1917, without exception show "vesicular neuritis."

The theory of centripetal diffusion of the toxin via the neurones seems borne out by the rarity of influenzal septicemia as compared with the frequency of neuralgia, &c., in influenza. It is very rare to find Pfeiffer's bacillus late in the disease and rarer still to find it in late complications. It is not even agreed that Pfeiffer's bacillus is the cause of influenza, but, assuming that it is, the diffusion of the toxin which has a partiality for the neurones mentioned is, to my mind, better explained by the theory of centripetal nerve diffusion (of tetanus) than it is by the theory of hemic diffusion.

No one is better aware than I am, however, that the pathological depths of this subject require far greater exploration before the theories herein propounded may become facts. Any information on the subject will therefore be very welcome.

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## THE NERVOUS FACTOR IN RELATION TO OPHTHALMIC CONDITIONS.

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THE war is the greatest nervous strain the world has ever known and has brought the nervous element in disease into prominence again. It is impossible to remain long in a large military hospital at the present time without seeing the essential similarity between the effects of fatigue, shock, and traumatism, and the results of intoxications, glandular deficiencies, dietetic errors, and psychic influences. The fact that a patient is cured by the exhibition of thyroid extract, or by a colectomy, or by judicious dieting, does not prove that the cause of his condition was either his thyroid, his colon, or his cook. What one wants to know is why his glandular secretion is no longer adequate, why his intestinal contents have become poisonous to him, and why he cannot eat the good square meals he used to enjoy.

Sir James Goodhart said many years ago that there are only two kinds of indigestion: that due to over-eating and over-drinking and that due to deficient nervous energy. The alimentary canal of a patient whose nervous energy is inadequate may show abnormalities of peristalsis, absorption, and secretion, all or any of which may be increased or diminished. Whether the actual discharge of secretion is due to a nervous or to a chemical stimulus, the trophic condition of the gland, and therefore the production of the secretion is under the control of the nervous system. There are, then, two ways of treating indigestion due to defective nervous energy, the one to order an easily digestible diet, the other to increase the available nervous energy. So also with the ductless glands, we may either exhibit what we think to be defective, or we may try to set more energy free with a view to restoring the natural harmony. Similar arguments apply to almost any part of the body, hence the therapeutic value of rest.

The total amount of nervous energy varies greatly in different persons, and this total amount may be so far reduced as to make the ordinary duties of life inadvisable or impossible by four different causes: (1) any exhausting stimulus or succession of stimuli; (2) poisons or toxins; (3) inadequate nourishment or loss of blood; (4) psychic influences. The existence of one cause favours the action of another. A man who is

suffering from a serious head injury is, *ceteris paribus*, more likely than another who is not to be infected by toxins, he will not stand a serious hemorrhage so well, and his recovery will be retarded by any great grief or anxiety. Similarly, an alcoholic is more liable than a temperate man to fall a victim to his own pneumococci after a chill, and not the least important factors in his treatment are rest, suitable nourishment, and freedom from worry. Such a condition of lowered nervous energy is in reality always a general one, but is apt to show itself more particularly in certain organs, either because they are points of least resistance or because the toxins at work have a special affinity for them. The presence of pyrexia also depends largely upon the predominance and nature of the toxic element. The existence of a gross organic lesion, such as mitral stenosis, is in itself a great tax upon the available nervous energy, and if it leads ultimately to death it does so because from some such causes as those mentioned above the nervous energy is no longer adequate to meet both this and the ordinary calls of the body.

In the present state of our knowledge the eyes are almost the only part of the nervous system which admit of constant direct mechanical assistance. Very few eyes are of perfect shape, and practically no pair of eyes. The imperfections are as far as possible corrected by neuro-muscular action, and, as it is only rarely that both eyes are symmetrical, the effort needed is usually different for each eye. Not infrequently also the balance of the external ocular muscles is not exact, so that further effort may be necessary to keep the visual axes parallel. All this muscular effort is constantly maintained except during sleep, and uses up a certain proportion of the total nervous energy, small indeed and probably inappreciable in health and youth, but far greater and more important in ill-health and as years advance. Indeed, in acute illness, when the patient is confined to bed, the ocular muscles are almost the only muscles not essential to life which are in comparatively constant use. That a patient should have trouble with his eyes during or after such an illness usually occasions but little surprise either to himself or to his physician, and they both expect them to improve with the general health. Much can be learnt as to the nature of morbid conditions by applying the converse of this and seeing what effect is produced upon these conditions by removing the ocular element as far as it is possible to do so, and so relieving the nervous energy of a certain amount of the work imposed upon it. The methods available for this purpose are: (1) covering or shading one or both eyes; (2) the use of cycloplegics; (3) the accurate correction of refractive errors; (4) the employment of prisms; (5) the use of tinted or Crookes's lenses.

In acute illness the patient is apt to protect himself by keeping his eyes shut and avoiding bright lights. When he is definitely complaining of one eye more than the other his general condition will almost always improve to a striking extent if the eye complained of is covered by a light comfortable shade. This should always be borne in mind in obscure conditions, such as intractable vomiting. Still further help may often be given by atropising both eyes, after excluding all possibility of glaucoma, and shading the one complained of. When covering one eye has given great relief, trouble may be expected when the shade is abandoned, and the patient should never be got up till he can use both eyes together again. Tinted glasses might be used with advantage in acute conditions more than they are, and when a patient has received benefit in comparative health from glasses correcting his refractive errors it is illogical for him to give them up entirely in severe illness. Shading or even bandaging both eyes may be of great value when an invalid has to be taken on a journey. In an acute illness, whatever its nature, the eyes should always be definitely inquired about with a view to relieving general symptoms. It is obvious that the methods referred to act, partly by diminishing peripheral stimuli and partly by lessening the calls on the nervous energy.

But it is from subacute and chronic conditions, in which time is not of so much importance and there is not so much confusion between *post* and *propter*, that one can learn most. Dark glasses may be of use in many such cases, but if they are used the tints should be reduced at rapid intervals or the patient may find it very hard to give them up. Covering one eye will be almost certain to improve the general condition if the eye is painful or cataractous, or

if there is any considerable anisometropia or heterophoria. Here, again, it is necessary to use common-sense and not to allow the patient to do all sorts of things because after a few days he feels much better, and so throw another form of strain upon the nervous system and only rob Peter to pay Paul.

The accurate correction of refractive errors is a most important method of studying nervous energy. The patient should be chosen because his symptoms are intractable and uncanny, because he does not convalesce in the orthodox way, because he gives a history of rheumatism, "influenza," appendicitis, &c., rather than because he is complaining of his eyes. Every system should be inquired into, and it is advisable, and makes a useful exercise, to elicit the information required without making any reference to the eyes. One soon becomes accustomed to the different manifestations of lessened nervous energy in the different systems, and it is usually easy to distinguish the malingerer from the genuine sufferer. One is playing with edged tools all the time, and has no right to order glasses as medical treatment unless the patient can be kept under observation until the accuracy of the correction has been proved. It may be possible to prescribe accurately at the first attempt, but I can only say that, after between four and five years' work at the subject from this point of view, I become more and more convinced day by day of the difficulties that have to be faced. One is trying to fit the rigid to the less rigid, and it is no easy task. The only test of accuracy is a decided improvement in the patient's general condition, obvious to himself and to others. The relief of headache is no test, and headache at least has the advantage of calling attention to the eyes, while other symptoms that may be substituted for it are far more subtle and therefore more dangerous. The more the nervous energy has been lowered the more obvious will be the patient's improvement, and the more quickly it will pass off if the correction is only partial.

A large stock of lenses should be kept, and the correction changed every few days until the greatest possible accuracy has been obtained, so that a minimum, and as far as possible equal, amount of work is left for each eye to do without changing its nature. The sphere is usually a greater difficulty than the cylinder, and the slightest over-correction of either element leads to the patient having ultimately to deal with a new unnatural error. When the real correction is R. + 0.375 C., L. + 0.125 S., + 0.25 C. and + 0.25 C. is ordered for each eye, there will almost certainly be great temporary improvement, but the remainders—viz., R. + 0.125 C., L. + 0.125 S., may ultimately prove at least as much trouble to the patient as the original condition. The smaller the error the easier it is to obtain accuracy; small degrees of myopic astigmatism are by far the easiest to deal with, and give most satisfactory results. A cycloplegic is almost always necessary, and if atropine is used the patient's comfort is often greatly increased by keeping one eye covered by a shade or opaque disc. If it is necessary for him to continue at work he can have the atropine in one eye at a time and keep the atropised eye covered. In difficult mixed or compound cases it may be advisable to get the worse eye right before starting on the other. Though good results are not probable unless the patient can be made to read at least 6/6, one should not be content with any artificial standard, but rather with the maximum acuity it is possible to get out of each eye.

Anyone who will try conscientiously to correct refractive errors on some such lines as these will find that he can do a great deal of good, and that he has opened up a fascinating method of studying the nature of morbid conditions.

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IN view of the value of the rabbit as food, the Vice-Chancellor of the University of London has given instructions that it shall not be used in practical examinations in zoology for science students or in general biology for medical students during the period of the war.

**THE CHARD TOWN COUNCIL. THE WATER-SUPPLY, AND COMPENSATION FOR ENTERIC FEVER.**—At the last meeting of the Chard town council the subject of the compensation for persons who had contracted enteric fever and who had claimed out-of-pocket expenses from the council came under discussion. The matter has been previously mentioned in THE LANCET. The finance committee, to whom the whole question had been referred, reported that they could not recommend the council to accept any responsibility or admit any claim.

## Clinical Notes:

### MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

#### A CALCIFIED FIBROID CAUSING COMPLETE AXIAL ROTATION OF THE UTERUS.

BY C. HUBERT ROBERTS, M.D. LOND., F.R.C.S. ENG.

THE patient was admitted to the Samaritan Hospital for Women. She was aged 55, married, no pregnancies. The periods had ceased for ten years, previous to which they had been very profuse.

The patient stated that she knew she had a tumour in the abdomen "for many years," but that it had given her very little trouble. About three months before admission she began to suffer with acute attacks of abdominal pain, which of late had been very severe and accompanied with cramps and sickness. Her general condition was good. On examination a large hard swelling could be easily felt in the abdomen, reaching to the level of the umbilicus, more marked on the left side than the right. It was very mobile and could be freely pushed about the abdomen. On vaginal examination there was a small atrophic cervix; movements of the abdominal mass communicated themselves to the cervix. The fundus could not be determined. The diagnosis was made of a calcified fibroid, ovarian dermoid, or ovarian fibroma. There was no free fluid.

On Nov. 16th last the tumour was removed by abdominal section. It was easily lifted out of the abdominal cavity, and was found to be densely hard and very heavy. The remarkable feature of the tumour was its pedicle, 8½ inches long, the thickness of two fingers, and consisted of an enormously elongated senile uterus, which at the level of the supravaginal cervix had undergone an acute axial twist, 2½ times, the twist being from left to right forwards. The appendages were included firmly in the twist. The torsion was easily undone, and the tumour simply amputated from the fundus uteri, to which it was attached by a pedicle 1½ inches wide. The vessels below the twist were deeply engorged, but there were no adhesions anywhere and no free fluid. The senile uterus and appendages were left *in situ*. The patient recovered completely, the temperature being normal throughout her stay in hospital.

The tumour was a well-marked example of complete calcareous degeneration of a fibroid. When fresh it weighed 4½ lb. It was so hard that it took a considerable time to cut through, and spoiled two saws in the process.

The importance of the specimen is that it caused axial rotation of the uterus. Axial rotation of the pedicle of a stalked fibroid is not uncommon, and may lead to acute degeneration of the tumour, but complete torsion of the uterus itself is very rare. I have not met with a case in my own practice before. Most of the cases reported of axial rotation of the uterus by a fibroid have been only partial—i.e., say half a twist—possibly leading to acute abdominal pain, accumulation of blood or pus in the uterus, or necrosis of the tumour.

In this case the twist was 2½ times, but as the uterus was senile and the pedicle very thin from long traction this amount of twisting was easily possible, in the same way as it sometimes occurs in pedunculated ovarian cysts.

Welbeck-street, W.

#### "THYROID STONE."

BY VERNON PENNELL, M.A., M.B., B.C. CANTAB.,  
FELLOW OF PEMBROKE COLLEGE, CAMBRIDGE.

THE following case may be of interest, owing to its comparative rarity.

The patient, a man aged 45, sought advice for aphonia which had lasted for three months, and which he thought might have been due to excessive smoking. On laryngoscopic examination, however, it was seen that the left vocal cord was completely paralysed and immobile. The heart, lungs, and central nervous system showed no lesion, nor was there any cervical gland enlargement. There was a small, hard lump on the left side of the neck, situated in the position occupied by the left lobe of the thyroid.

It moved upwards and downwards on swallowing and did not appear to be very fixed in its attachments, except when attempting lateral movements. In size it was about that of a small walnut, and was slightly tender on deep palpation. A diagnosis of early carcinoma of the thyroid with infiltration of the left recurrent laryngeal nerve was made, and operation recommended. The thyroid was exposed by a transverse incision at the root of the neck and the left lobe identified. On delivering the upper pole forwards, a craggy mass of rock-like consistency was found, rather larger than had been expected from external palpation, in the position normally occupied by the superior parathyroid. It was tightly wedged between the thyroid gland and the oesophagus and vertebral column, and pressed on the recurrent nerve of that side. As part of the left lobe presented several small cysts, it was deemed advisable to perform hemithyroidectomy. The wound healed by first intention and the patient made an uninterrupted recovery, regaining full vocal power after three days.

The growth proved to be a completely calcified adenoma with only the thinnest of capsules stretched over it. It was quite easily detached from the remains of thyroid tissue of that side. As no sign of a superior parathyroid was found after careful examination it is conceivable that this mass was parathyroid rather than thyroid in origin. The diagnosis would almost certainly have been greatly assisted by a skiagram, but this was unfortunately omitted and an unnecessarily gloomy prognosis given.

Pembroke College, Cambridge.

#### AN OBSCURE CASE OF PSOAS ABSCESS.

BY EVELYN A. CONSTABLE, M.B., B.S. DURH.,  
SURGICAL REGISTRAR, LONDON TEMPERANCE HOSPITAL.

THE case on admission presented difficulties of diagnosis, and is for that reason worth recording.

The patient, a female, aged 41 years, married, was sent in, on Dec. 16th, 1916, by Mr. F. Greaves, to the London Temperance Hospital, under the care of Mr. J. McClure, complaining of pain in the right loin and vomiting. Three weeks before admission there was gradual onset of "aching pain" in the right side of the abdomen, accompanied by vomiting, which had occurred twice or thrice daily for the last two weeks. Bowels opened daily (only took aperient once). Menstruation was usually very regular; the last period was two weeks over time, so patient ascribed her symptoms as probably due to pregnancy. She had never had a similar attack before. There was nothing in the past history bearing on the case. Condition on admission: Tongue dry, red, and ridged. Some gingivitis and dental caries. Appetite usually very good. Urine neutral, specific gravity 1018; no albumin or sugar. Spine: no tenderness on percussion or other abnormality detected after careful examination. Locally a hard, oval-shaped mass of the size of a small cocoanut extended from just below and to the right of the umbilicus to the right costal margin; it was slightly movable at the inner pole but appeared fixed at the upper and outer one. It did not move on respiration. Per vagina the cervix was soft and lacerated, "erosion" present; uterus freely movable. Blood count by the pathologist, Dr. H. H. Sanguineti: Hb 65 per cent.; erythrocytes 5,560,000, leucocytes 25,500 per c.mm. Differential count, per cent.: Polymorphonuclears, 89; lymphocytes, 10; transitional, 1. Diagnosis: ? Malignant disease of ascending colon; ? kidney tumour; ? appendix abscess.

Laparotomy by Mr. McClure on Dec. 31st. A vertical incision, 5 inches long, was made over the tumour in right hypochondrium. The "tumour" turned out to be a normal right kidney, pushed forward by a large psoas abscess. The latter was incised below and posterior to the lower pole of the kidney, and about 1½ pints of green homogeneous pus were evacuated, evidently coming from the spine. The cavity was irrigated with a flushing curette. The posterior peritoneal layer was then approximated by interrupted sutures and the anterior abdominal wall closed in layers. No drainage. The vermiform appendix and gall-bladder were examined and appeared normal. The skin and subcutaneous tissues, unfortunately, broke down, but afterwards did well on Dakin's hypochlorite dressings, and patient left hospital on Jan. 29th, 1917, with only a very small superficial wound.

X ray skiagram, taken by Dr. J. H. Rhodes after the operation, showed some erosion of the right side of the body of the second lumbar vertebra.

A somewhat similar case, I am informed, occurred in this hospital about 16 years ago. I am indebted to Mr. McClure for permission to publish the above notes.

West Green, N.

## Medical Societies.

### ROYAL SOCIETY OF MEDICINE.

#### SECTION OF ELECTRO-THERAPEUTICS.

##### *The Origin of Electric Currents led off from the Human Body.*

AN ordinary meeting of this section was held on March 16th, Dr. G. HARRISON ORTON, the President, being in the chair.

Professor W. M. BAYLISS read a paper entitled "The Origin of the Electric Currents led off from the Human Body." It was concerned with an examination of the book on the subject of "Electric Pathology" written by Mr. Baines. The whole of this theory, and the practice founded upon it, depended on what Mr. Baines termed "nerve leaks," these leaks being detected by the use of silver electrodes and a high-resistance, very sensitive galvanometer. The human body was a very heterogeneous system, the solids of which in a dry state were non-conductors of electricity, but when soaked with salt solutions became conductors. So that the human body, as a whole, was a conductor, of a kind, but not at all comparable to that of a telegraph cable. It was not merely the salts in the solutions which conducted the electricity; it was the ions of the salts, from which they were dissociated when dissolved in water. The dissolving in water split the salt up into two separate parts, each of which had an opposite electrical charge, though when united together they were neutral. Though that seemed obvious, it was not the view taken by Mr. Baines in his book, for he said: "It is now held that this view is incorrect, and that when a salt is dissolved in water its constituent molecules undergo, to a greater or less extent, atomic as well as molecular dissociation, so that a portion of the electrons become free and are diffused throughout the water as ions." Mr. Baines spoke as though electrons and ions were identical. It was one of the chief errors underlying the thesis. This was confirmed in the glossary, for ions were defined as "free electrons in gases, fluids or solids." There was no proof that atomic disintegration took place when salt was dissolved in water. The sodium ion was non-volatile; and it was an electric charge united to a sodium atom. When that reached the skin it could not get further; it could not have escaped to the air, though if there were free electrons conceivably they might escape, if there were a sufficiently high potential. Mr. Baines assumed the existence of "neuro-electricity"—namely, a stream of free electrons passing down the nerves. It was safe to assume that the body, though full of ions, had no free electrons, so that anything which demanded the presence of free electrons could not take place. The second point was, that silver electrodes were used to lead off these currents. It was impossible to get two pieces of the same metal so nearly alike that when immersed in salt solution there would not be sufficient difference of potential between them to deflect the sensitive galvanometer which Mr. Baines used. He (the speaker) had failed to get two electrodes so similar that this did not happen, though they were cut from the same bar. A difference of only 6/1000ths of a volt caused such deflection. Mr. Baines ought certainly to have tested his electrodes first. What would be the effect of placing these electrodes on different portions of the skin? Dry skin ordinarily possessed a high resistance, but when the skin was moistened its resistance was lowered, and the difference between the readings from the two constituted one of Mr. Baines's "nerve leaks." It was found that the electrodes were unequal by immersing them in salt solution, and therefore it was known that the source of the current in that case must be at the surface of the electrodes. Since one was more positive than the other, if they were changed round the current was reversed, but it did not always happen when one reversed the connexions with the galvanometer. This Mr. Baines insisted upon as a proof of the occurrence of nerve leaks. The reversal when changing from one hand to the other showed there must be a source in the body itself. Another proof that there might be a source of electromotive force in the skin itself was by using not metallic electrodes, but by employing what physiologists called non-polarisable electrodes, which could easily be made equi-potential, so that the electrodes themselves gave rise to no current at all; hence anything observed was due to something

in the skin. But Mr. Baines would have nothing to do with non-polarisable electrodes, though the reasons he gave were very difficult to understand. Still, he said that was the reason no advance had been made in electro-physiology since 1877. The answer to that was, that one could not get a true representation of electrical changes in a structure like the human body unless one used electrodes which were not polarisable. What was the source of electromotive force in the skin? Clearly, the activity of the sweat glands was associated with this change, and one could not be sure of the degree of activity of these glands in any part where one led off. This accounted for Mr. Baines's second kind of nerve leak. It added itself on to the first one. Why were these "nerve leaks" more easily detected in cases of shell shock and other neurasthenic conditions? A Russian physiologist found that various mental states were associated with various localised activities of sweat glands. The changes in the electromotive activity of glands and other tissues in the body were explained most readily by the presence of a membrane which allowed one kind of ions to pass through, but did not allow other kinds to do so; it might be due to its own electrical charge or to the size of the pores. But they could not leave the neighbourhood of the membrane because of the influence of the oppositely charged ion inside the membrane. The second kind of nerve leak was more genuine than the first, but it had nothing to do with the escape of neuro-electricity. With regard to the question of static charges that was a difficult question, as was also that of inductive capacity. Mr. Baines evidently meant by a static charge what happened when one stood on an insulated stool and charged the body from a source of static electricity. But that did not influence any process going on inside; he had tested the point with a galvanometer. The static capacity was of no importance in the physiology of the human organism. The inductive capacity puzzled him a great deal, for he did not know what was to prove that the body had an inductive capacity. "Neural electricity" Baines defined as "a form of energy resembling, but not identical with, electricity"; but in another place he spoke of neural electricity as circulating in the coils of the galvanometer. If it were ordinary electricity, the tying of the cut ends of a nerve and surrounding it with an insulator would result in its conduction as if it were not cut. But everyone knew such was not the case, and no muscular contraction followed. Most probably it was associated with some kind of polarisation of membranes—i.e., movement of ions. As to the practical application based upon these theories, if the conditions described were due to leakage of nerve energy, and that energy was a form of electricity, applying an insulator would cure the case. The author included in conditions favouring leakage inflammatory states such as pneumonia, the reason being that inflammatory cells were not properly supplied with nerve energy. Baines said that if any cell or group of cells was isolated from nervous influence and control the whole of its activities ceased in a short time. But was it true that cells and tissues would not behave normally unless they were in association with the nervous system and receiving a perpetual supply of nerve energy? Clara Jacobson, in America, tested the rate at which wounds made on opposite legs of an animal healed, when the nerve-supply to one was cut and that to the other remained intact; and she found no difference in the rate. The whole theory of nerve energy rested on the erroneous assumption that energy was present in the nervous system to only a limited extent; so that energy used in one way left less for other purposes. Baines used "dielectric oil" to stop the nerve leak, and this was found to be fairly good quality liquid paraffin, which had been dried, probably by the application of heat to it. It was claimed that the process employed conferred upon the paraffin properties which could not be detected by any chemical or physical means. The obvious answer to that was, that if the properties could not be detected it was of no use making the statement that they were there. The great penetrating power of this dielectric oil on the skin—it was said, when applied for pneumonia, to go right through the chest and appear on the bedclothes at the back—rested upon very inadequate evidence. To test this penetration Professor Bayliss allowed a pad to soak on the skin and tested the electrical resistance between the part soaked with paraffin and another part, but during three hours there was no change of resistance. To

state that the temperature of a case of pneumonia fell after its application meant nothing, for a fall of temperature in that disease was often quite spontaneous. Professor Bayliss summarised the conclusions he had reached on the matter as follows. The currents led off from various parts of the body by metallic electrodes were due to the inequality of the electrodes and to differences in the activity of the skin glands. Neither static charges nor induction played a part in the phenomena. "Nerve leaks" were merely places at which the skin was moist. The view that neuro-electricity is generated in the brain, and escaped from nerves owing to a breakdown of insulation was devoid of evidence and contrary to our knowledge of physiological processes.

In the ensuing discussion Dr. AGNES SAVILL said she had had very little experience with the "dielectric oil," but it had been good. She quoted the case of a lady who had eczema of both feet, to an equal degree in each, and the foot on which the dielectric oil was used healed quicker and was less irritating in the process than was its fellow.

Captain HERMANAN-JOHNSON spoke of the value of the method in diagnosis. He took two cases to be tested by it, the natures of which were unknown to Dr. Hill Wilson, who saw them for the purposes of the test. One, a case of chronic dysentery, showed a violent deflection of the mirror when the mid-dorsal region of the spine was reached. The other was diagnosed as having something wrong with the pelvic organs; it was a case of dysmenorrhoea followed by amenorrhoea. He did not think the question of unequal moisture of skin played a part, because the skin was previously rubbed with a rough dry towel.

A number of questions were asked, to which Professor BAYLISS replied.

#### SECTION OF OBSTETRICS AND GYNECOLOGY.

*Exhibition of Specimens.—Total or Sub-total Hysterectomy for Removal of Myomata.—Curious Degeneration of Cervical Tumour.*

A MEETING of this section was held on March 1st, Dr. G. BLACKER, the President, being in the chair.

Dr. CUTHBERT LOCKTER showed: (1) Specimens illustrating Simultaneous Pregnancy in each Fallopian Tube; and (2) a Metastatic Glioma (Neuro-epithelioma) of the Ovary in a child of 3 years.

Dr. HERBERT SPENCER read: 1. A paper on two cases of Supravaginal Amputation for Sarcoma Mistaken for Myoma. The patients recovered, but the disease recurred. The operations were performed 17 and 20 years ago. It was these two mistakes in diagnosis which led him to study the relative advantages of amputation and total hysterectomy, and to decide very strongly in favour of the total operation. 2. A paper on four cases of Undiagnosed Cancer of the Cervix in 200 Total Hysterectomies for Myoma. All the cases were squamous carcinoma; two were very early and high up in the cervical canal; the others more extensive, but out of reach on account of the presence of pelvic tumours. The first died from heart disease within a year of the operation; the second remained well after six years; the third remained well for five years, but died of recurrence after nearly six years; the fourth recurred within a few months. He appealed to the advocates of supravaginal amputation for a comparative record of 100 or 200 cases followed up and examined for five years after operation. He had not himself performed this operation for the last 16 years.—The PRESIDENT said that the question whether total or sub-total hysterectomy was the best operation for the removal of fibro-myomata of the uterus was one of great importance. With sarcomatous degeneration of such a tumour, however, the question was not so important as it was when a carcinoma developed in a fibroid uterus. So far as he knew, the cases recorded in the literature showed that the chances of recurrence were equally great, whether the cervix was retained or not. He asked if the recurrence had involved the cervix in the two cases recorded by Dr. Spencer.—Dr. H. R. ANDREWS stated that he had at one time performed panhysterectomy as a routine operation for fibroids, but for the last 10 years had removed the whole cervix only in cases in which laceration and eversion of the cervix made it probable that there would be persistent discharge if the whole cervix was not removed. His practice was to scoop out most of the cervix, and in doing this he had only once found unexpected carcinoma,

although he had removed many uteri which contained both fibroids and carcinoma. During the last eight years 761 hysterectomies for fibroids, chiefly subtotal, had been performed at the London Hospital. Dr. Andrews and the late Dr. R. D. Maxwell had been for many years on the look-out for carcinoma occurring in the cervix that had been left behind, but no such case had been seen at the London Hospital.—Dr. T. W. EDEN remarked that two of Dr. Spencer's cases, although in a very early stage of the disease, died from recurrence, and it could not be doubted that an extended hysterectomy (Wertheim) would have given them a better chance. To be consistent, Dr. Spencer should have advocated Wertheim's operation instead of panhysterectomy.—Mr. J. D. MALCOLM said that he had for many years removed the whole uterus in operating for fibromyoma after seeing two cases in which he had attributed septic trouble to a spread of infection from the cervix uteri.—Mr. T. G. STEVENS said that in his opinion the appearances seen in the microscopic sections of Dr. Spencer's first two cases were those of erosion of the cervix.—Dr. SPENCER replied.

Dr. C. HUBERT ROBERTS read a short paper on a Curious Degeneration of a Cervical Tumour removed from a patient aged 35 years. He also showed a specimen of a Calcified Fibroid causing complete axial rotation of the uterus; an account of the case is published on p. 454 this week.

#### Reviews and Notices of Books.

*Syphilis and the Nervous System.* By Dr. MAX NONNE. Translated by CHARLES R. BALL. Second American edition. London and Philadelphia: J. B. Lippincott Company. 1916. Pp. 450. Price 18s. net.—This edition of Dr. Nonne's classical work is based on the third German edition of 1915. The six years which had elapsed between the appearance of the second and third German editions have seen the *Spirocheta pallida* given its proper place in the causation of general paresis as well as of tabes, and the portion of the book dealing with this subject has therefore largely been rewritten. But the general arrangement based on clinical lines has been retained and constitute the value of the work as a useful guide to practice. Some minor blemishes remain unaltered from the last edition and may probably be due to the great distance by which author and translator are separated. The appearance of a new edition is timely.

*A Historical Sketch of the General Infirmary at Leeds.* Leeds: Richard Jackson.—This little book tells the story of the General Infirmary, Leeds, from its inception in 1767. At this time a house was rented at £16 per annum, two physicians and four surgeons were appointed, as well as a matron and nurse at the princely salaries of £10 and £5 a year respectively. Among the first surgeons to the infirmary was a pupil of John Hunter, Mr. William Hey, F.R.S., to whom the honour of founding the institution is in large part due. A century later, that is, between 1869 and 1901, the infirmary was rebuilt at a cost in land and buildings of approaching £230,000, and a further extension was carried out as a memorial to the late King Edward at the added cost of £150,000. The number of in-patients rose from 76 in 1768 to 6071 in 1900 and to 9703 in 1915, and these figures show better than words the remarkable growth in a century and a half of an institution with which have been associated the names of many well-known physicians and surgeons. The story, which is illustrated with portraits of the founder and others associated with the infirmary, has been compiled from annual reports and makes no pretence to completeness. It gives, nevertheless, a worthy account of a great institution.

*Pharmacology and Therapeutics.* By HORATIO C. WOOD. Second edition. London and Philadelphia: J. B. Lippincott Company. 1916. Pp. 455. Price 18s. net.—The new edition of this text-book has been held back to await the appearance of the new U.S. Pharmacopoeia, which has necessitated a complete revision of its contents. The articles on such products as veronal, pituitary extract, and salvarsan have been rewritten, and a number of substances such as bromural, picrotoxin, and thiosinamin considered for the first time. The author welcomes the adoption of the term mil in place of c.c. for the thousandth part of the litre. The book will be of interest to all whose reading takes them outside the statutory requirements.

*Representative Procedures in Quantitative Chemical Analysis.* By FRANK AUSTIN GOOCH. New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Limited. 1916. Pp. 262. Price 8s. 6d. net.—We have presented here by a well-known authority on the subject a valuable series of analytical methods applied to inorganic substances; the particulars of procedure described give trustworthy and accurate results in the light of the latest experience. We are glad to note the author's appreciation of "the beauty and accuracy" of the iodometric processes, and he has given a much more extended treatment of this section of the subject than is usually the case in analytical text-books. The clear and careful directions set out mark the experienced hand at analytical work. Useful ground is covered in regard to procedures in both gravimetric and volumetric analysis, but in the latter section we find no reference made to the convenient reduction methods in which titanium salts are used as reducing agents.

*The Motor-car.* By T. O. A. LAWTON and R. J. HARVEY GIBSON. London: Edward Arnold. 1917. Pp. 87. Price 1s.—This is a simple little primer that takes the intending driver by the hand, so to speak, like "Little Henry's Guide to French," and leads him step by step to knowledge and, if coupled with practical instruction, to the confidence that should justify him in taking the road unaided. It is all very elementary. Whether such aids are more easy to understand than the usual text-books is a question.

*Organotherapy Products.* Issued from the Bacteriological Research Laboratories of Evans Sons Lescher and Webb, Limited, Higher Runcorn, Cheshire. February, 1917. Pp. 60.—With this catalogue and price-list of their organo-therapeutic products the manufacturers have incorporated 10 pages of text describing the principles of hormone therapy and 40 pages more on the preparation and uses of organ extracts. The notes are well printed and well arranged, and will afford the busy practitioner useful information on the therapeutic material available in this still somewhat obscure region of medicine.

#### JOURNALS.

*The Philippine Journal of Science, Section B, Tropical Medicine.* Vol. XI, No. 3.—Dr. Edward S. Ruth writes on the development of twins and other polyembryos with special reference to four sets of duck twins. After reviewing the work done already on the subject, this observer, in a series of approximately 500 duck eggs that were incubated for embryological material, found four sets of twins. One set had developed to the 3-somite stage and the other three sets respectively to the 9-, 11-, and 12-somite stage. In only one set were the embryos completely separated from each other; in the others the embryos were joined along their lateral sides and would in all probability have developed into joined twins. The underlying causes involved in the formation of twins and other polyembryos are obscure. It has, however, been definitely shown that in some anamniotes twins, triplets, quadruplets, &c., can be produced by mechanical and chemical changes. These definite results have been obtained by altering the environment by external agents. If the intrinsic factors be considered, Dr. Ruth thinks that little imagination is needed to conceive of distorted embryos, twins, &c., as being due to a faulty metabolism or to some physical law that is so wrapt up in physio-chemical processes that it is still impossible to solve the mystery. This paper is illustrated by three plates.—The influence of fresh and autoclaved cow's milk on the development of neuritis in animals is discussed in an article furnished jointly by Dr. R. B. Gibson and Dr. Isabelo Concepcion. They were led to make experiments by the fact that the use of "canned whole cow's milk" for feeding infants is rapidly increasing in the Philippine Islands, and they sought to obtain information as to whether or not the antineuritic vitamines of milk are destroyed by heating. It would appear from previous experiments that antineuritic properties, if present in milk, exist only in very small amounts, and in none of the observations already reported has milk prevented the development of neuritis. Accordingly, the authors directed their attention to ascertaining by feeding experiments whether or not antineuritic substances were present in milk, and to what extent these would be affected by autoclaving the milk for two hours at 125° C. The first observations were made

on fowls, but subsequently on young dogs and pigs. The results on the latter animals indicated that autoclaving the milk did not affect appreciably either the growth promoting principles in it or the nutritive value of the caseinogen. The antineuritic vitamine is present in milk in slight amount, and continued feeding of dogs and pigs with either fresh or autoclaved milk, without suitable additions to the diet, induced certain beri-beri-like symptoms, such as degeneration of the peripheral nerves, persistent oedema, and aphonia. There was no evidence that autoclaving milk for two hours at 125° C. affected in any way its nutritive value. The authors remark, in conclusion, that at the best the antineuritic powers of the milk are so slight that in infant feeding the diet should be extended as soon as possible. They further suggest that the young of healthy mothers probably come into the world with a reserve supply of the vitamine substances sufficient to tide them over nutritively until the time when, under natural conditions of life, they would begin to eat other food. This article is illustrated by two plates.—The remaining contribution to this number of the *Journal* deals with the blood pressure picture of the Filipinos, and is supplied jointly by Dr. Isabelo Concepcion and Dr. Emilio Bulato. Little work on blood pressure has previously been done in the Philippine Islands. The authors give details of the observations they made by the graphic method with the Erlanger sphygmomanometer on 717 persons whose average age was 28·5 years. Their findings showed that the systolic pressures of Filipinos were very much lower than those of Americans. The average pulse pressure was 36·4 millimetres in males and 32·6 in females; there was a general rise of systolic, diastolic, and pulse pressure with age. For a given age the systolic pressure is more variable than the diastolic. The pulse pressure does not differ very much between the different ages, and persons with blood pressure below 20 or above 50 millimetres are probably abnormal. Hypertension is not a necessary accompaniment of old age. The pulse-rate of Filipinos averaged a few beats above the usual standard of 72 per minute. Examination of 65 persons addicted to the opium habit showed that in all of them the blood pressure averages were lower than normal.

*The British Journal of Ophthalmology.* Vol. I., Nos. 2 and 3 (February and March).—These numbers of the new journal contain several interesting original papers. Colonel R. H. Elliot publishes a paper read at the Oxford Ophthalmological Congress on Some Eccentricities of Indian Ophthalmic Practice. It deals with the grave injuries to the eyes inflicted by the use of primitive methods of treating conjunctivitis, trachoma, corneal opacities, and so on, and its debonair style is somewhat ill-suited to the recording of tragedies.—Captain J. A. Pringle reports a good case of multiple aneurysms of a retinal artery, associated with opaque nerve fibres. This paper is illustrated by an excellent coloured plate.—The report of a case of quinine amaurosis by Dr. Arthur J. Ballantyne is particularly noteworthy in that an early stage was observed in which the retinal arteries were not constricted, as is almost invariable in this form of poisoning. The case is very carefully discussed and good reason is shown for the view that the blindness is due to the direct toxic action of the drug upon the retinal elements, and not, as has been generally thought, to ischaemia.—There is a noteworthy sketch of the life of William Mackenzie (1791-1868), the great Glasgow ophthalmologist, by Dr. J. Freeland Fergus. The author writes his name "McKenzie," though he is generally known as Mackenzie, and this is the mode in which his name appears upon the title page of his own treatise on Diseases of the Eye. The facts of Mackenzie's life are well set forth, but the paper gives the impression of a somewhat grudging tribute to his genius. To state that he "has left practically nothing which will be permanently associated with his name" is an admission of the shortness of human memory and of the transitoriness of fame. To say that "he was not an investigator" is to detract from one of the greatest clinicians that ever lived. His original observations were far more numerous than Dr. Fergus gives him credit for, and they were so accurate that they are taught as the commonplace knowledge of to-day. Amongst the many abstracts of papers contained in these two numbers there is a valuable series on war injuries. The proprietors of the *British Journal of Ophthalmology* are to be congratulated on the success of their magazine in spite of the unusual difficulties produced by the war. That it is indispensable to ophthalmic surgeons and is not without its appeal to a wider circle are matters on which we congratulate the editor and his supporters.

**Endocrinology.** Vol. I., No. 1. January, 1917.—The first number of this new quarterly, published by the Association for the Study of Internal Secretions (secretary, Dr. Henry R. Harrower, Glendale, California; subscription \$5 a year in advance, single copies \$1 50 post paid), contains an introductory article by Lewellys F. Barker, of Baltimore, who believes that its appearance will be welcome to clinical and laboratory investigators, as well as to the "more alert general practitioners, for these men already realise the profound importance of an intimate knowledge of the ductless glands and their functions for everyday work in diagnosis and therapy." C. E. de M. Sajous, of Philadelphia, contributes an editorial article on the Future of the Internal Secretions, in which he describes organotherapy as opening up avenues of thought to a new conception of medicine which will satisfy the longing for logical reasoning and rationalism. He believes with Abderhalden that the tissue cell disposes of the same or similar ferments to those secreted by the digestive glands and that the leucocytes are the carriers of these ferments. Other brief editorial articles are written by Tom A. Williams, of Washington, and Henry R. Harrower, of Los Angeles. Three original articles follow: the first by Dr. Emile Sergeant, physician to the Charité, Paris, calling attention to the "ligne blanche surénale," which suggests to him the search for other signs of "hypo-adrenia." The rest of the volume is occupied by 60 pages containing nearly 200 brief abstracts and reviews of articles on internal secretions in the medical journals of the world.

## THE CONTROL OF VENEREAL DISEASES.

### Civilian Treatment Centres in France.

In his recent book on the problems of syphilis under French military régime ("La Syphilis et l'Armée." Paris : Masson et Cie. 1917. Price 4 fr.), Dr. G. Thibierge devotes a section to the creation of treatment centres for the civilian population. In Paris medicaments for the treatment of syphilis have long been distributed on a large scale at the special hospitals of St. Louis, Broca, and Cochin. From 1902, when mercurial injections became general, Dr. Thibierge and Dr. Brocq greatly extended the out-patient treatment of syphilitic women at the Hôpital Broca, other hospitals following suit with similar polyclinics. Sunday and evening consultations were arranged to suit all, and no pressure was placed on the patients to attend. Similar services were arranged in most large towns. In March, 1916, these services were still further extended on the advice of Inspector-General Vaillard and M. Brisac, director of assistance and public hygiene, and it was decided to institute dispensaries, called *services annexes des hôpitaux*, in every district where there was a call for them. gratuitous treatment to be provided under conditions of strict secrecy and with the help of military doctors if civilian practitioners were not available. In a circular dated May 31st, 1916, the Minister of the Interior instructed departmental prefects to bring pressure on local sanitary authorities to institute centres, and assured them of financial help from the State. Dr. Thibierge states that only in a few cases were the authorities recalcitrant, and that the number of patients attending the centres has increased with great rapidity. He mentions Dr. Pautrier, of Bourges, as an enthusiast whose example has set the tone of the work in general.

### Port of London.

The City Corporation is starting a treatment centre at the Royal Albert Docks at an estimated cost of £600.

### Publicity.

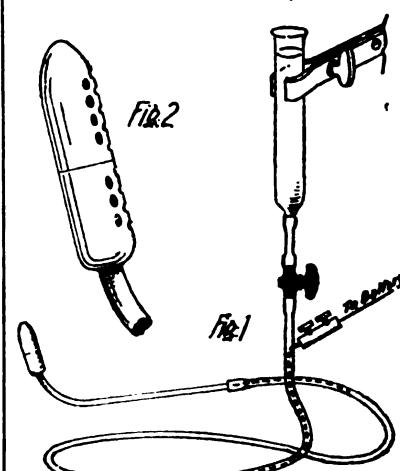
Dr. Harold Kerr, medical officer of health for Newcastle-on-Tyne, has issued a circular, published in full by the local press, calling attention to the facilities provided for treatment as well as to the need for such treatment. He asks all into whose hands the circular may come to use their "personal influence to promote the knowledge of good and evil that alone can save many from the consequences of ignorance," and to assist the sanitary authority by making the facilities provided widely known.—Following on an address given by Sir Francis Champneys at a public meeting in Glasgow on March 12th, a local branch was formed of the National Council for Combating Venereal Diseases. The

suggestion was made that further branches should be established at Edinburgh, Aberdeen, and Dundee.—Sir Malcolm Morris and Sir Thomas Barlow addressed a meeting of ministers of religion at the Small Queen's Hall on March 9th on the necessity for their co-operation in the campaign of publicity and enlightenment.

## New Inventions.

### AN ELECTRODE FOR THE IONIC TREATMENT OF PROSTATIC ENLARGEMENT.

I HAVE found that the enlarged prostate can be treated successfully by ionisation, and have designed an electrode for the purpose. The negative wire from the battery passes by a terminal right through the tube conveying the fluid down to the bulb of the instrument. The stem of it is insulated as far as the bulb, thus ensuring that no contact is made with the lower part of the rectum. The bulb is lubricated with glycerine and passed into the rectum well on to the prostate. The current I use is 20 millamps for half, increasing to one, hour on alternate days. As some irritation may be caused by the introduction of the bulb I have occasionally found it necessary to have the patient introduce a 4 gr. morphia suppository half an hour before coming to



me. Three to six months are required to effect the reduction, according to the age of the tumour. One case of ten years' standing took nearly twelve months. I was able to send away a man of 50 with a perfectly normal prostate and able to urinate freely, after only three months' attendance, but his condition was of only eighteen months' duration.

The instrument illustrated (Fig. 1) is designed to carry out the principle that there should be a constant supply of the fluid from which it is proposed to derive the ions at the seat of application. The face, which is perforated with a number of small holes (Fig. 2, shown on a larger scale) is pressed on to the prostate, and the hollow bulb (which unscrews in the centre) is packed lightly with cotton wool sufficient to ensure a steady trickle of fluid from the reservoir (the cylinder of a 2-ounce syringe inverted), on which a vulcanite tap regulates the outflow so that just sufficient runs down to last for the period of the sitting. Ten grains of potassium iodide dissolved in 2 ounces of sterilised water is the usual quantity.

Sydney, N.S.W. LEIGHTON KESTEVEN, M.R.O.S. Eng.

**BRISTOL HOSPITAL SUNDAY FUND.**—Up to the present £2252 have been received as a result of the Hospital Sunday collections in Bristol, and of this sum £2000 have been awarded to the local medical institutions.

**THE FOOD PROBLEM.**—Lecturing on the "Food Problem" at the Institute of Hygiene on March 15th Mr. J. Grant Ramsay, principal of the institute, said that both health and money would be saved by a better knowledge of food values, while, in addition, the public must be brought to realise that internal waste—i.e., food that could be done without—represented a squandering of health as well as of food. Mr. Ramsay detailed his proposal of a ration-book which had been submitted to the Ministry of Foods. This was to be a compulsory housekeeping book issued officially, in which all foods bought would be entered by the tradesman. The housekeeper would be saved from making the entries and the tradesman from drawing up any other account. Such a ration-book would provide an exact record of food bought, induce care and economy, and allow each individual to claim his fair share of rations.

# THE LANCET.

LONDON: SATURDAY, MARCH 24, 1917.

## "War Nephritis."

IN a recent discussion at the Royal Academy of Medicine in Ireland Dr. T. GILLMAN MOORHEAD and Dr. R. J. ROWLETTE took the view that the condition thus described is due to an infection, an impression which seems to be gaining ground among many observers. Dr. W. M. CROFTON related six cases in which he had administered a vaccine from organisms obtained from the urine with apparent benefit, but, as pointed out by other speakers, it is difficult to substantiate this claim in a disease which tends to spontaneous improvement. Some important observations have been made by TRÉMOLIÈRES and CAUSSADE on the renal functions in these cases.<sup>1</sup> They employed three tests for renal permeability—the effect of injections of indigo carmine, the elimination of chlorides, and the estimation of the urea in the blood. In this country the two methods have been employed in war nephritis by Mr. J. TREVAN at St. Bartholomew's Hospital, but as far as we know the indigo carmine method had not been previously tried. They injected subcutaneously 4 c.c. of a 4 per cent. solution in sterile distilled water. The excretion of the dye should normally begin in 20 minutes, reach its maximum in half to one hour, and be completed in 6 to 7 hours. In war nephritis it is possible for an exaggerated elimination of the dye to coexist with chloride retention. A drawback to its use is that it may provoke haematuria. They noted the same effect after the administration of 10 grammes of salt, but this never occurred in the 21 cases thus examined at St. Bartholomew's. With regard to the urea in the blood, they are of opinion that the usually accepted figure of 0'04 per cent. is too high; the average for soldiers without any renal lesion was 0'0265 per cent. They do not appear to have used the estimation of urinary diastase, which was found so useful by MACKENZIE WALLIS and subsequently by ADLER. From the results obtained by applying these three methods TRÉMOLIÈRES and CAUSSADE classified the cases of nephritis as follows:—

(a) Cases with insidious onset; these constitute one third of the total, and they respond normally to the tests for renal permeability. The albuminuria is the only renal symptom. They can be subdivided into two clinical types. In 10 per cent. of the total the albuminuria becomes intermittent and finally disappears, and recovery is apparently complete. In 24 per cent. there is residual albuminuria which is variable in amount, and not influenced by exertion. The physical value of such soldiers is diminished, but is sufficient. Some, however, have a persistent albuminuria, which is readily increased by fatigue and dietetic excess. Such cases may be on the way to chronic nephritis and the prognosis should be guarded. (b) Cases with acute onset. These again can be subdivided into two groups. 44 per cent. of the total show increased elimination of indigo carmine, with retention of chlorides, oedema, and haematuria. These may improve to the stage of simple albuminuria with normal renal permeability or may become chronic. 14 per cent. show more

extensive damage; the patients are usually above 30 years of age and complain of cramps and dead fingers. The elimination of indigo carmine is diminished, there is retention of chlorides, and the urea in the blood is increased, reaching 0'055 to 0'1 per cent. This excess of urea in the blood soon yields to a low nitrogen diet. Some of these may still be fit for military service; they have a normal heart without hypertrophy and the blood pressure is not more than 170-180 mm. They have not got chronic nephritis and their incapacity does not seem a definite bar to military service. (c) 7 per cent. quickly assume the features of chronic nephritis with cardiac hypertrophy, gallop rhythm, accentuation of the second sound at the aortic base and a rise of arterial tension. They are unfit for further military service. Death may occur from uræmic convulsions, pericarditis, or acute oedema of the lungs.

It will be noted that the French authorities recommend the retention of a far larger proportion of such patients for active service than is now the practice in the British Army. By a recent Army Order all cases of nephritis among our troops are kept in hospital for three months, and if then free from albumin are only to be employed for home service. Soldiers over 38 who have had nephritis and who show any cardiovascular change with persistent albuminuria are to be invalidated out of the service. Soldiers with persistent albuminuria, but without cardio-vascular change, are not to be retained in a higher category than C3. This more cautious policy is based on the liability to recurrence which has been observed, and seems to be the wisest course.

## The Moral Imbecile.

A WOMAN named ALMA COURTWRIGHT, 28 years of age, was recently convicted at the Old Bailey upon charges of robbing ladies who had engaged her as a servant, and after previous convictions for like offences had been proved against her was sentenced to penal servitude for five years. Before this was done the Court had been informed that the prisoner, after leaving prison in 1913, had been "certified as a moral imbecile," but that a Poor-law medical officer had declined to certify her as insane. The police view of the case was that she was one of the cleverest of her class, a plausible and dangerous criminal, and the judge is reported as having said, in passing sentence, that she "might be a moral imbecile," but that she was also an ingenious, clever thief. The observations quoted illustrate the attitude of the criminal law of the United Kingdom and the majority of those who administer it towards a fairly large class of prisoners, who, being without the same safeguards, are nevertheless treated by both judge and jury precisely as those prisoners are treated who show no signs of mental deficiency. That this is just cannot reasonably be asserted, but it is not a matter in which the general public is greatly interested. That it is undesirable is, however, realised by medical men more generally than by laymen. Members of the legal profession practising at the criminal bar, and judges, for the most part, display a scepticism which may be described as traditional when the irresponsibility of the committer of a criminal act is suggested, and very few lawyers not directly concerned with the administration of the criminal law are interested in questions connected with it.

<sup>1</sup> Annales de Médecine, vol. iv., No. 1, Jan.-Feb., 1917.

In the United States of America there is a greater tendency to investigate problems relating to crime, the power of individual States to initiate their own experimental reforms independently of their neighbours contributing to produce results which, even when not wholly successful, are instructive. The Municipal Court, Chicago, which tries criminal and civil cases, more or less comparable to those heard by our magistrates and county court judges, established during the year 1914 a psychopathic laboratory, to which notice has been given in these columns,<sup>1</sup> and not only defendants but sometimes witnesses suspected of mental defects are referred to it by the various branches of the Court. ALMA COURTWRIGHT would have obtained more satisfactory treatment, from the medical point of view, in Chicago, for as a chronic offender she would have certainly come in for investigation at the laboratory. The difficulty of dealing with chronic offenders prompted the foundation of the institution, which has followed upon the establishment in the United States of America of various types of prisons and reformatories where industrial education is given, and of systems of releasing prisoners on probation or parole. These innovations have introduced a wide range of possible sentences for a judge to choose from, and have rendered desirable full information on his part if he is to choose rightly. Those who have instituted the laboratory have recognised this fact, and also that there exists a close connexion between mental and physical defectiveness and criminal conduct. The report of the Municipal Court of Chicago recently issued points out clearly that it is the defective born in surroundings of poverty and moral danger who become criminals. Better circumstances safeguard the defective from crime. The child of poor parents who acquires the reputation of being lazy, perverse, or stupid at school is removed thence at the earliest opportunity because he makes no progress, and is sent out to work for his living, only to find the discipline of employment even less helpful than that of school, and his deficiency still a bar to his success. He becomes used to failure, so that he expects it, as others do for him. His appetites and desires are not less than those of his normal colleagues, but he has not their capacity for inhibition and for realising the wrongness or the consequences of evil-doing, and so his downfall becomes natural and easy. But it was his poverty that largely contributed to his total failure; with money he could have been sheltered and, possibly, much improved.

The report goes on to discuss what should be done with the criminal who is found to be feeble-minded, or whose case is complicated by the diagnosis of dementia praecox, and recommends confinement for the latter class in farm-colonies under proper supervision. The question of procedure in diagnosing and eliminating the feeble-minded from the ranks of the ordinary criminal must, however, be decided before their disposal can be usefully discussed, and perhaps in some future year the example of Chicago may be found valuable as a guide. In this country we have recently passed

an Act of Parliament dealing with mental deficiency in a comprehensive manner, and in more settled times the experience gained in its administration may produce good results. The case we have cited shows, however, that at present we do not deal satisfactorily with those who, though not in a condition to be confined as lunatics, nevertheless are a danger to the community owing to mental defects. Young persons who are in process of becoming thus dangerous should be our prompt care, recognising the importance of early treatment as a preventive measure. In this connexion attention may be called to the general complaints now being made of juvenile crime and depravity. It may be assumed reasonably that of the young persons of both sexes who are to-day giving trouble on an unprecedented scale, and who are stated to be unruly in the absence of their parents, or to be the victims of the sinister influences of picture palaces, or to be unable to withstand the temptations of darkened streets, some are those whose mental equipment is a little less than normal. Possibly their parents have bequeathed to them an undesirable inheritance, and, being defective themselves, have been bad educators of their offspring; at all events many of these juvenile delinquents cannot fairly be judged by normal standards.

### Arsenic in Food Preparations.

A NOTE issued in October last year by the Chief Inspector of Foods pointing out to public analysts the desirability of examining baking powders, egg-powders, self-raising flours, and so forth, for arsenic, has been justified by subsequent events. At Maidstone, for example, the county analyst, Mr. F. W. F. ARNAUD, has reported several instances of arsenical contamination of these food preparations arising out of their containing impure acid phosphate. In two instances an excessive amount of arsenic was detected in egg-powder: it contained, in fact, 10 parts of arsenic per million, while a baking powder contained 6·6 parts per million. Two samples of egg-powder received from the local sanitary authorities were also found to contain excessive amounts of arsenic. In 26 samples of egg-powder and baking powder no arsenic was detected, but in the remainder of the samples arsenic varied in amounts from 0·1 to 3·0 parts per million. Arsenic was absent in four of the self-raising flours, but 19 samples contained it in quantities varying from 0·2 to 2·0 parts, the average amount found in these samples being rather more than 1 part of arsenic per million. The Royal Commission on Arsenical Poisoning recommended that action should be taken under the Sale of Food and Drugs Acts when any liquid is found to contain 1/100th of a grain or more of arsenic in the gallon, or when any solid contains 1/100th grain of arsenic or more in the pound. This amounts to 1·43 parts per million, a limit which will be seen is largely exceeded in some of Mr. ARNAUD's cases. Again, at Stratford police court last week a grocer was convicted of selling baking powder which was contaminated with 1/18 grain of arsenic per pound. Our public health authorities will need to exercise increased vigilance over the food-supplies just now, for much departure from pre-war standards is allowed, and this increases the temptation to use inferior and possibly contaminated materials.<sup>2</sup>

<sup>1</sup> THE LANCET, 1916, II., 1069.

## Annotations.

"*Ne quid nimis.*"

### THE EFFECT OF THE WAR ON THE SUPPLY OF DRUGS.

A VERY interesting and instructive review of the position of the supply of drugs in war time was given in a paper read before a recent meeting of the Royal Society of Arts by Mr. F. A. Hocking, B.Sc., pharmacist to the London Hospital. At the outset it is good to learn from one who knows that while much has been written and said concerning our real or supposed dependence on Germany for medicinal chemicals, the situation here has for the most part been described with some exaggeration. While not underrating the position of the enemy in this matter Mr. Hocking rightly says that it is not necessary to fall into the opposite error of unduly depreciating the abilities and resources of our own country. It is not true to say that Germany was the source of all drugs of any importance, and that with the outbreak of war supplies ceased. As examples opposed to this extreme view are quoted the alkaloids, the number of which, or their salts, used in the London Hospital in the year 1914 was about 15. Of these, seven—namely, apomorphine, acetomorphine, morphine, codeine, caffeine, strychnine, and emetine—were, and are, manufactured in England on a large scale, not merely for home consumption but also for export to all parts of the world, and both for quality and quantity these English products, Mr. Hocking says, rank easily first. Coming to anaesthetics and antiseptics, ether, chloroform, ethyl chloride, carbolic acid, creosote, and iodoform are produced in this country in large quantities. The same is true of alcohol and glycerine, now so urgent, however, in the production of munitions. Germany held the field chiefly in the matter of synthetic drugs; but synthetic drugs do not constitute the whole *materia medica*, and the more important of them—e.g., acetosalicylic acid, novocain, veronal—are now being made in England. It is further interesting to learn that the production of iodine from Chili saltpetre is largely controlled by Great Britain, and while the price of potassium iodide rose a few shillings per pound in December, it has since fallen to practically the pre-war figure. Potassium bromide is perhaps the best example of a big rise in price owing to the monopoly left in the hands of American dealers by the shutting off of German supplies. In July, 1914, the price of bromide of potassium was 1s. 6*d.* per pound; at one time it reached the figure of 25s. per pound, and is now quoted at about 7s. 6*d.* per pound. France is competing with the American product by manufacturing bromine from sea water in substantial quantities. It is hoped to revive the kelp industries in Scotland and Ireland in which potash from sea-weed ash is recovered. Potash minerals have been discovered in important quantities in Spain, which later may prove to be a source of serious competition to the German industry at Stassfurt. Altogether it seems that the pharmaceutical world can get on quite comfortably without German intervention, if proper care is taken in the future to organise the drug and allied industries with the view of securing them permanent prosperity. Such a consummation would be clearly prejudiced if the following incident, quoted

in the paper, be allowed to be repeated. It appears that when acetomorphine was first made and introduced in England by a Scotch firm, but little interest was manifested in it by the medical profession, whereas the same drug put on the market by the Germans under the name of "heroin" was taken up with alacrity.

### REPORT FOR 1915 OF THE REGISTRAR-GENERAL FOR IRELAND.

Sir William Thompson's report on Irish Vital Statistics which has just been published contains several features of public health interest that invite special attention in time of war. In the absence of his former medical colleague the Registrar-General appears to have been solely responsible for the preparation of all reports issued since the outbreak of hostilities; nevertheless, the present volume fully sustains the high character of its predecessors. Prominent among statistical matters, it is noteworthy that the loss of population by emigration from Ireland in 1915 was proportionally the lowest on record, being only 2·5 per 1000 living at all ages, or less than half the ratio in the preceding year. The marriage-rate was the highest hitherto attained, but the birth-rate still continues to fall, being equal to 22·0 only per 1000 of the population. The death-rate at all ages, as well as among infants in their first year, was somewhat higher than in the previous year. It is satisfactory to observe in the present report a considerable amplification of the statistics of mortality in the earlier years of childhood. Great disparity is shown in the loss of infant life in the urban as compared with the rural districts of Ireland, the rate of infant mortality in the 27 principal towns averaging 134 per 1000, or no less than 92 per cent. in excess of that in the remainder of the country. If the rate of mortality in the town districts had been the same as in the rest of Ireland there would have been in 1915 a saving of 2072 infant lives. Compared with the preceding year there was an increase in the mortality from bronchitis of 1·84 per 1000 births and of 1·34 per 1000 from wasting diseases, whilst there was a decrease of 1·94 per 1000 in the mortality from diarrhoeal diseases and a decrease of 0·57 per 1000 in the mortality from measles. Locally the incidence of infant mortality varied enormously. Corrected for births and deaths in institutions the rate was highest, 163 per 1000, in Dublin, 158 in Queenstown, 155 in Newtowndale, and 143 in Londonderry. It was lowest, 44 per 1000, in Bray and next lowest, 64 per 1000, in Tralee. In the year under review there was, as compared with the decennial average, a fall in the aggregate mortality from common epidemic diseases except scarlet fever and influenza. The deaths from tuberculous disease numbered 9525 and were equal to 12·5 per cent. of the deaths from all causes. In the year 1910 the deaths thus returned had amounted to 10,016, but from that date onwards the number fell annually, until in 1914 they reached 9089, when they were the fewest on record. Stated in terms of population, tuberculous mortality in 1915 corresponded to a rate of 2·20 per 1000 living of both sexes, which was 0·13 above the rate of the preceding year, but still below the average rate in the preceding decennium by 0·19 per 1000. The rate was 1·5 per 1000 in England and Wales and 1·6 per 1000 in Scotland. In Ireland the male population suffered from fatal tuberculosis at the rate of 2·28 per 1000,

or 0'17 in excess of the rate in the previous year, whilst the female population suffered at the rate of 2'11 per 1000, or 0'07 above the rate for that year. It appears that the decrease in tuberculous mortality is progressing more rapidly among females than among males. About four-fifths of the deaths from tuberculous disease were ascribed to the pulmonary form of the affection, the deaths from which in 1915 were equal to 1'81 per 1000 among males and to 1'67 per 1000 among females. As in England, this disease is especially destructive to young adults of both sexes, 73 per cent. of the total deaths being those of persons between the ages of 15 and 45 years. No diminution is recorded in the mortality from malignant disease, the deaths in the year under review being equal to 88'2 per 100,000 of the population, as compared with 81'2, the average rate in the ten years 1905-1914.

#### THERAPEUTIC VALUE OF DIRECT SUNLIGHT ON SCURVY.

⑧ Naval Staff Surgeon Dr. Asbeck was detailed in May, 1915, to tend the Turkish wounded in the Reserve Hospital Harbié at Constantinople, and he relates, in the War Supplement of the *Münch. med. Wochenschr.* of Jan. 9th, how in the following autumn and winter scurvy was one of the worst enemies he had to deal with. The number of wounded men was, he says, at that time so great that it was impossible to supply them all with tinned vegetables, and all grades of scurvy were in evidence, from grouped cutaneous petechiae, favouring the thighs, to large haemorrhages into the subcutaneous tissue, joints, and serous cavities. Wounds were brownish-black in colour with glazed surface, bled freely at each dressing, and showed no tendency to skin over. Insolation effected immediate improvement in all this and as the direct sunlight increased in intensity with the season, both wounds and scorbutic ulcers rapidly healed under the treatment, the diet remaining meanwhile unchanged. By June no case of scorbutic ulcer remained in the hospital. Alike with the local improvement the general condition mended, the patients who had all been heavy and depressed becoming gay and light-hearted after their sun-baths.

#### DIETARY ALLOWANCES.

THE Local Government Board has issued a schedule to the boards of guardians to help them in framing their dietaries so as to bring the consumption of flour, meat, and sugar within the scale specified by the Food Controller. No dietary tables which admit of an average consumption of those foods in excess of the scale will remain in force after March 31st next. The schedule permits three-fourths of the bread allowance to be replaced by other foods, and for this purpose the following are deemed equivalent to 1 lb. of bread or  $\frac{4}{5}$  lb. of flour—namely,  $\frac{4}{5}$  lb. of barley, oatmeal, rice, sago, tapioca, or maize meal; or 5 oz. of butter, margarine, or fat. The caloric value of the pound of bread is exceeded by the oatmeal allowed, and is equalled, or nearly so, by the other foods. If sago, tapioca, or the fats are used, the quantity of protein furnished is reduced, but as the dietary contains other protein-rich foods, no harm is likely to arise on this account. Any wilful waste of bread is to be treated as a breach of discipline. A pound of meat, without bone, may be replaced by 5 oz. of cheese or by 8 oz. of beans, lentils, or peas. There is less food value and protein in these than in

the meat, but the liberal standards of times of peace and plenty cannot be defended at present. Some saving of sugar is also recommended by the substitution of syrup, treacle, honey, saxon, or saccharine. On the whole, when the need for stern economy is considered, the recommendations are on a liberal scale. The schedule recognises the need of elasticity in feeding children, and calls upon the medical officer to advise in the substitution of foods according to individual requirements, so as to secure that each child shall be adequately fed without waste. He is, of course, solely responsible for the food of the sick and of infants, but his attention is called to the desirability of effecting any economies compatible with their needs.

#### HORSE-SICKNESS OF RHODESIA.

In the *Rhodesia Agricultural Journal* Mr. L. E. W. Bevan, M.R.C.V.S., Government veterinary bacteriologist, refers to this disease which affects horses and mules, and caused a loss of £30,000 to the colony in the year 1911. It is due to an ultra-visible virus contained in the blood, exudates, and bronchial secretions of animals affected. It is communicable to dogs by inoculation and by feeding upon infected meat. Animals that recover from the disease acquire a certain degree of immunity, but this is not complete against reinfection. Theiler found that "the serum of an immune animal which has periodically been immunised acquires immunising properties." The immunising of mules against horse-sickness has been practised in the colony since 1895. This is done by a simultaneous injection of serum and virus, and Southern Rhodesia has derived enormous advantage from it.

#### MEDICAL SIMILES IN LITERATURE.

ONE of the great differences presented between the general literature of the masters of the nineteenth and twentieth centuries and the works of their predecessors, both immediate and remote, is the disappearance of the medical simile. The reasons for this are well summed up in an attractive paper by Dr. W. R. Jordan in the January issue of the *Midland Medical Journal*. Dr. Jordan points out that the scholar of the Renaissance took all learning as his province, anatomy, physiology, and psychology with the rest, and used that learning to illustrate his points and exemplify the types of his creation. The medical learning of such a scholar was necessarily derived largely from the treatises of Galen and his great forerunner Hippocrates. Hence the medicine of imaginative writers from Rabelais and Shakespeare at one end to the age of Anne at the other is derived from Hippocrates; for it was at least 50 years after Harvey's great discovery before its meaning was obvious to readers as well as writers to an extent that would make the introduction of similes drawn from Hippocratic medicine appear ridiculous. Rabelais, physician as well as priest, lectured upon the works of Hippocrates and Galen, and it is natural that his immortal medley should be full of allusions to their science. The so-called First Book of Rabelais, or chronicle of Gargantua, contains elaborate anatomical remarks on page after page, and throughout all the Books a knowledge is shown by the writer, and assumed by him for the reader, of the physiology of the day. Next to Rabelais comes Shakespeare in his love of the medical simile, founded on the physiology and pathology which were universally

accepted before the publication of Harvey's discovery. Such physiology and pathology lent themselves extraordinarily well to literary similes, the reason for this being that they resolved themselves into general doctrines, supported by authority, and uncomplicated by opposing theories. Matter was composed of four or five elements having certain elementary and opposing qualities. The human body was a mixture in average proportions of these things, variations in those proportions giving rise to the different temperaments. "From the doctrine of the four elements to that of the humours is an easy translation," says Dr. Jordan, "for there was a close relation between the two; indeed, the term elements is occasionally somewhat loosely applied to the humours and also to the elementary contraries." Galen set forth the relations between the humours, the elements, and their qualities, and complicated the story by introducing the season of the year as a factor in pathology. Upon physiology and pathology of this kind Chaucer, Bacon, Ben Jonson, and especially Shakespeare, perpetually drew, while Dr. Jordan's quotations from many authors prove that numerous passages, which are quite well known, and some which are frequently quoted, lose their exact application for readers who cannot appreciate the origin of the metaphors employed or the reasons for the phraseology.

#### THE PROGRESS OF THE ROYAL MEDICAL BENEVOLENT FUND.

WE publish in another column a short account of the annual general meeting of the Royal Medical Benevolent Fund, which was held last week. We have regularly noted the activities of the Fund from month to month, and can assume that our readers are familiar with them; but the report, which was laid before the supporters of the Fund, presented features to which particular attention may well be drawn. The retirement of Sir John Tweedy from the Presidency was announced at the meeting, and brought into prominence the facts that during his decade of office the Fund had obtained a Charter of Incorporation and the Guild, or Ladies' Branch in connexion with the Fund, had been started. The Guild has done, and is doing, a work of steady and unobtrusive charity. The election of the honorary treasurer, Dr. Samuel West, to succeed Sir John Tweedy as President afforded an opportunity for calling attention to the organisation of the finances of the Fund, which had taken place during the 22 years of Dr. West's treasurership. Within that period the output of the Fund in charity has doubled, the invested property has risen, in rough figures, from £50,000 to £100,000, and the number of annuities granted has increased by more than 50 per cent. This is a great record of administrative work, and would by itself commend the Fund to wide support, but at this juncture a further claim is made by it upon the attention of all members of the medical profession, in order that they may use their influence among their patients. The Fund has made a War Emergency Appeal with special reference to the claim which the medical profession has on the public. Many doctors, owing to their sudden call to naval and military duty, have had to leave their practices inadequately provided for, and on their return will no doubt find them impaired by their absence despite anything which the Central Medical War Committee may desire or propose to the contrary. To

meet the difficulties the War Emergency Appeal has been started, and substantial sums may have to be granted, but the amount at present available is quite insufficient. The Fund will no doubt have heavy demands made on it. The public realises the splendid services rendered by the medical profession in the war, and it is hoped that they will give the Emergency Appeal liberal support. The most effectual way in which this can be done is by medical men bringing the movement and its needs to the notice of their well-to-do patients.

#### THE METROPOLITAN WATER-SUPPLY.

THE issue this week of the report on the condition of the metropolitan water-supply during the month of December, 1916, concludes the monthly returns for that year. The last reports we dealt with referred to the condition of the supply during the months of August, September, and October. November was a comparatively wet month, the mean rainfall in the Thames basin being 4·28 inches, which is 1·58 of an inch above the mean rainfall for that month during the previous 33 years. The effect on all the three raw waters (Lee, Thames, and New River) was a deterioration in quality, as judged by the albuminoid nitrogen, permanganate, turbidity, and colour tests. The filtered waters likewise deteriorated in quality, according to these tests, except that the filtered water of the Lee river showed no change as regards colour. Compared with the 1915 averages all three raw waters yielded results worse than their respective averages. The filtered waters also yielded, generally speaking, results worse than their respective averages. In regard to bacteriological results all three waters contained more bacteria than their respective averages for the year 1915, but the filtered waters yielded not unsatisfactory results, 93·1, 90·9, and 56·4 per cent. of the filtered waters derived from the three river sources containing no typical coli even when 100 cubic centimetres of the water were examined. In December the mean rainfall was 3·41 inches, or 0·39 of an inch above the average for this month during the previous 33 years. Some improvement in the chemical quality of the raw waters was shown on the previous month, and compared with the 1915 averages there was improvement in the raw Thames water, but some deterioration in the Lee and New River waters. The filtered waters also showed some deterioration in quality and contained more bacteria than their respective averages for the year 1915, the results showing that 67·4, 50·0, and 41·1 per cent. of the filtered waters respectively contained no typical *B. coli* in 100 cubic centimetres.

THE house of the Royal Society of Medicine will be closed from Thursday to Tuesday, April 5th to 10th, both inclusive.

IN the Education Estimates issued on Monday last a grant of £1,000,000 is announced for the encouragement of scientific and industrial research. The dispensation of the money is vested in the hands of a committee of the Privy Council.

A PAPER by Surgeon-General Sir C. Pardey Lukis, K.C.S.I., K.H.S., M.D., F.R.C.S., on "Opportunities for Original Research in Medicine in India," will be read at a meeting of the Indian Section of the Royal Society of Arts, on Tuesday, 27th inst., at 4.30 P.M. The paper will be followed by a discussion.

**REGISTRAR-GENERAL'S ANNUAL SUMMARY  
FOR 1916,  
AND RETURN FOR THE FOURTH QUARTER.**

To Sir Bernard Mallet's return for the fourth quarter of last year a considerably abridged summary is appended, giving the principal information respecting births, marriages, and deaths contributed by the local registrars in the complete year 1916. In commenting on the last quarterly return in THE LANCET of Dec. 16th, 1916 (p. 1024), we referred to the discontinuance, as a separate publication, of the familiar "Annual Summary" which had been issued from the Central Office for a large number of years. This publication has always been highly appreciated by local medical officers of health, who are thus supplied with valuable matter not otherwise available for the compilation of their annual reports. A brief analysis of the mortality tables of 1916 appeared in our issue of Jan. 27th, 1917 (p. 162). Of the total deaths 45·6 per cent. took place in public institutions in London, 29·6 per cent. in the great English towns, and 16·4 per cent. in the smaller towns. In the fourth quarter of 1916 the birth-rate of England and Wales was 20·1 per 1000 living, or 0·6 more than in the corresponding quarter of last year. The natural increase of population, by excess of births over deaths, was 46,961, an enormous drop from the figure for the year before the war, when it was 89,045. The deaths registered during the quarter were equal to 14·9 per 1000 of the assumed population. Infant mortality was equal to 99 per 1000 births, being 19 per 1000 below the average for the quarter, and, with one exception, the lowest on record for the fourth quarter of the year. In the usual table the death-rate from the several causes are given for the several towns, the figures relating to the civil populations only. Among the great towns the highest death-rates per 1000 from epidemic diseases were as follows: From enteric fever 0·31 in Burnley and 0·34 in Tynemouth; from measles 1·18 in Edmonton and 1·26 in Coventry; from scarlet fever 0·13 in Gateshead and 0·22 in Walsall; from whooping cough 0·43 in Exeter and 0·95 in Great Yarmouth; and from diphtheria 0·88 in Carlisle and 1·00 in St. Helens. The returns of notifiable diseases show the following rates of sickness per 1000 living in London and the average rates in groups of provincial towns. The annual rate from enteric fever was 0·11 per 1000 in London, in 243 provincial towns it was 0·16, in 95 great towns 0·14, and in 148 smaller towns 0·22. From scarlet fever it was 1·61 in London, 1·99 in 243 provincial towns, 1·92 in the

great towns, and 2·18 in the smaller towns; and from diphtheria 2·18 in London and 1·39 in each of the other areas.

**URBAN VITAL STATISTICS.**

**VITAL STATISTICS OF LONDON DURING THE YEAR 1916.**

In the accompanying table statistics of sickness and mortality in the City of London and in each of the metropolitan boroughs are summarized for the year 1916. With regard to the notified cases of infectious diseases, it appears that the number of persons reported to be suffering from one or other of the 10 diseases specified in the table was equal to a rate of 5·1 per 1000 of the population, estimated at 4,310,030 persons; in the three preceding years, the rates were 6·7, 9·0, and 7·1 per 1000 respectively. Among the various boroughs the rates last year ranged from 3·2 in Kensington and in the City of Westminster, 3·5 in St. Marylebone and in Hampstead, and 3·7 in the City of London, to 5·2 in Finsbury and in Deptford, 6·8 in Greenwich, 7·5 in Stepney, 7·8 in Shoreditch, and 8·4 in Bethnal Green. Only one case of small-pox was notified last year, against 11 in the preceding year. The prevalence of scarlet fever showed a great decline last year; 8766 cases were notified, against 25,015 and 17,104 in the two preceding years. Among the metropolitan boroughs the greatest proportional prevalence of this disease was recorded in Finsbury, Shoreditch, Bethnal Green, Stepney, and Deptford. The Metropolitan Asylums Hospitals contained 913 scarlet fever patients at the end of last year, against 4431 and 2431 at the end of the two preceding years; 8542 new cases were admitted during the year, against 23,154 and 16,327 in the two preceding years. Diphtheria was rather less prevalent than it had been in the preceding year; 8754 cases were notified, as compared with 9166 in 1915. This disease was proportionally most prevalent in Shoreditch, Bethnal Green, Stepney, Southwark, and Greenwich. The number of diphtheria patients remaining under treatment at the end of last year in the Metropolitan Asylums Hospitals was 1479, against 1663 and 1476 at the end of the two preceding years; the number of cases admitted during the year was 8883, against 8444 and 868 in the two preceding years. Enteric fever was considerably less prevalent than it had been in other recent years, only 463 cases being notified, against 758, 779, and 647 in the three preceding years. The greatest proportional prevalence of this disease was recorded in Paddington, the City of Westminster, St. Pancras, Holborn, Bethnal Green, Wandsworth, and Greenwich. The number of enteric fever patients admitted into the Metropolitan Asylums Hospitals during the year was 324, against 415, 470, and 446 in the three preceding years; 37 cases remained under treatment at the end of the year, against 51, 68, and 50 at the end of the three preceding years. The greatest proportional prevalence of erysipelas occurred in Shoreditch, Bethnal Green, Stepney, Poplar, Southwark, and Deptford. The 277 cases of puerperal fever notified during the year included 22 in Fulham, 21 in Islington, 21 in Lambeth, 20 in Wandsworth, 18 in St. Pancras, 17 in Poplar, 16 in Bethnal Green and in Southwark, and 15 in Woolwich. The 427 cases of cerebro-spinal meningitis included 39 in Islington, 33 in Lambeth, 31 in Stepney, 27 in Wandsworth, 24 in

**ANALYSIS OF SICKNESS AND MORTALITY STATISTICS IN LONDON DURING THE YEAR 1916.**  
(Specially compiled for THE LANCET.)

CITIES AND BOROUGHS.	Estimated civil population, 1916.	Notified Cases of Infectious Disease.										Deaths from Principal Infectious Disease.													
		Small-pox.	Scarlet fever.	Diphtheria.*	Typhus fever.	Enteric fever.	Other continued fevers.	Puerperal fever.	Erysipels.	Cerebro-spinal meningitis.	Total.	Annual rate per 1000 persons living.	Small-pox.	Measles.	Scarlet fever.	Diphtheria.*	Whooping-cough.	Enteric fever.	Diarrhoea and enteritis (under 2 years).	Total.	Annual rate per 1000 persons living.	Deaths from all causes.	Death-rate per 1000 living.		
LONDON...	4,310,030	1	8766	8754	1	453	23	277	2383	427	192	21,792	5·1	—	—	815	146	604	793	15	1598	4031	0·9	61,373	14·3
<i>West Districts:</i>																									
Paddington ...	131,397	—	273	209	—	21	—	8	106	9	4	630	4·8	—	4	4	9	22	2	58	99	0·8	1839	14·0	
Kensington ...	155,795	—	211	153	—	20	—	11	85	21	1	502	3·2	—	6	2	9	11	2	39	69	0·4	2286	14·7	
Hammersmith ...	118,559	—	207	215	—	6	—	8	48	3	3	490	4·1	—	25	4	15	12	1	34	91	0·8	1642	13·9	
Fulham ...	151,161	1	235	312	—	5	—	22	74	12	3	714	4·7	—	18	5	20	32	1	63	139	0·9	1959	13·0	
Chelsea ...	58,421	—	108	101	—	8	—	2	28	5	1	253	4·3	—	4	—	15	16	1	19	55	0·9	948	16·3	
City of Westminster ...	135,104	—	177	152	—	24	—	8	56	10	3	430	3·2	—	9	—	12	8	5	29	63	0·6	1782	13·2	
<i>North Districts:</i>																									
St. Marylebone ...	100,260	—	118	134	—	13	1	—	73	8	2	349	3·5	—	7	2	6	21	3	30	69	0·7	1500	15·0	
Hampstead ...	81,761	—	136	93	—	6	—	2	39	5	1	288	3·5	—	1	—	4	8	—	6	19	0·2	840	10·3	
St. Pancras ...	201,322	—	441	428	—	36	1	18	112	20	9	1065	5·3	—	41	9	22	39	5	48	164	0·8	3103	15·0	
Islington ...	316,242	—	638	538	—	32	—	21	154	39	13	1445	4·7	—	83	18	45	60	10	108	324	1·0	4782	15·2	
Stoke Newington ...	50,527	—	86	109	—	4	—	4	19	7	5	233	4·6	—	1	4	6	1	9	21	0·4	635	12·6		
Hackney ...	217,883	—	411	359	—	23	2	8	163	24	21	1016	4·7	—	39	5	28	36	2	70	178	0·8	2857	13·1	
<i>Central Districts:</i>																									
Holborn ...	40,405	—	66	99	—	9	—	2	22	3	3	204	5·1	—	3	2	10	3	—	11	29	0·7	656	16·3	
Finsbury ...	76,915	—	201	188	—	4	—	4	59	19	4	479	6·2	—	33	2	13	12	—	39	102	1·3	1430	18·6	
City of London ...	19,461	—	34	25	—	2	—	1	7	2	—	71	3·7	—	—	—	—	—	—	1	0·1	227	11·7		
<i>East Districts:</i>																									
Shoreditch ...	103,627	—	315	30	—	11	12	3	128	18	6	801	7·8	—	34	11	20	36	5	96	202	2·0	1819	17·6	
Bethnal Green ...	120,207	—	395	383	—	18	1	16	167	19	9	1008	8·4	—	22	5	23	45	2	77	172	1·4	1759	14·7	
Stepney ...	265,731	—	729	931	—	37	1	10	245	31	12	1993	7·5	—	67	13	34	75	7	121	322	1·2	3812	14·4	
Poplar ...	156,247	—	310	340	—	19	—	17	162	19	20	887	5·7	—	50	7	23	44	5	104	238	1·5	2511	16·1	
<i>South Districts:</i>																									
Southwark ...	179,424	—	370	44	—	13	—	16	173	24	13	979	5·5	—	84	5	41	44	2	86	262	1·5	3039	17·0	
Bermondsey ...	117,188	—	253	264	1	11	1	2	100	17	14	665	5·7	—	42	4	27	15	2	57	147	1·3	1959	16·8	
Lambeth ...	284,188	—	513	424	—	19	1	21	114	35	12	1157	4·0	—	48	8	42	46	1	126	271	1·0	4235	14·9	
Battersea ...	161,945	—	332	359	—	14	—	1	94	16	4	849	5·3	—	26	7	28	30	1	56	146	0·9	2187	13·5	
Wandsworth ...	312,249	—	633	529	—	46	3	20	153	27	7	1488	4·7	—	23	5	55	50	5	67	205	0·7	3634	11·7	
Camberwell ...	254,385	—	495	463	—	12	—	11	171	9	17	1184	4·7	—	23	10	26	31	1	86	177	0·7	3382	13·3	
Deptford ...	110,299	—	305	255	—	6	—	5	105	6	1	883	6·2	—	33	5	13	14	1	54	120	1·1	1642	14·9	
Greenwich ...	98,385	—	193	369	—	14	—	6	60	6	2	651	6·8	—	43	4	22	23	6	38	141	1·5	1414	14·7	
Lewisham ...	164,438	—	305	251	—	11	—	6	73	9	2	656	4·0	—	14	1	19	23	4	45	111	0·7	1909	11·6	
Woolwich ...	129,505	—	228	265	—	9	—	15	92	6	—	613	4·7	—	24	4	11	32	1	22	94	0·7	1686	13·1	
Port of London ...	—	—	—	3	—	6	—	—	—	—	9	—	—	—	—	—	—	—	—	—	—	—	—		

\* Including membranous croup.

Hackney, and 24 in Southwark. The 192 cases of poliomyelitis included 21 in Hackney, 20 in Poplar, 17 in Camberwell, 14 in Bermondsey, 13 in Islington, 13 in Southwark, 12 in Stepney, and 12 in Lambeth.

The mortality figures in the table relate to deaths of persons actually belonging to the various metropolitan boroughs, and are obtained by distributing the deaths in institutions among the boroughs in which the deceased persons had previously resided. During last year the deaths of 61,373 London residents were registered, equal to a death-rate of 14·3 per 1000; in the three preceding years the rates had been 14·2, 14·4, and 16·1 per 1000. The lowest death-rates last year were 10·3 in Hammersmith, 11·6 in Lewisham, 11·7 in the City of London and in Wandsworth, and 12·6 in Stoke Newington; the highest rates were 16·3 in Chelsea and in Holborn, 16·8 in Bermondsey, 17·0 in Southwark, 17·6 in Shoreditch, and 18·6 in Finsbury. The deaths from all causes included 4031 which were referred to the principal infectious diseases; of these, 815 resulted from measles, 146 from scarlet fever, 604 from diphtheria, 793 from whooping-cough, 75 from enteric fever, and 1568 from diarrhoea and enteritis among children under 2 years of age. The death rate from these diseases in the aggregate ranged from 0·1 in the City of London, 0·2 in Hammersmith, 0·4 in Kennington and in Stoke Newington, and 0·5 in the City of Westminster, to 1·4 in Bethnal Green, 1·5 in Poplar, in Southwark, and in Greenwich, and 2·0 in Shoreditch. The 815 fatal cases of measles were 1111 fewer than the corrected average number in the five preceding years; this disease was proportionally most fatal last year in Finsbury, Shoreditch, Poplar, Southwark, Bermondsey, and Greenwich. The 146 deaths from scarlet fever were 87 below the corrected average number; the greatest proportional mortality from this disease was recorded in Islington, Stoke Newington, Shoreditch, Stepney, and Poplar. The 604 fatal cases of diphtheria were 24 in excess of the corrected average number; this disease shows the greatest proportional mortality in Chelsea, Holborn, Shoreditch, Southwark, Bermondsey, and Greenwich. The 793 fatal cases of whooping-cough were 181 below the corrected average number; the highest death-rates from this disease were recorded in Shoreditch, Bethnal Green, Stepney, Poplar, Southwark, Greenwich, and Woolwich. The 75 deaths from enteric fever were 56 fewer than the average, and included 10 in Islington, 7 in Stepney, 6 in Greenwich, and 5 each in the City of Westminster, St. Pancras, Shoreditch, Poplar, and Wandsworth. The mortality from diarrhoea and enteritis among children under 2 years of age was greatest in Finsbury, Shoreditch, Bethnal Green, Stepney, Poplar, Southwark, Bermondsey, and Deptford. In conclusion it may be stated that the aggregate mortality in London last year from these principal infectious diseases was 42·7 per cent. below the average.

(Week ended March 17th, 1917.)

**English and Welsh Towns.**—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18,000,000 persons, the annual rate of mortality was equal to 18·5, against rates declining from 22·5 to 17·1 per 1000 in the four preceding weeks. In London, with a population exceeding 4,000,000 persons, the death-rate was 19·3, or 0·8 per 1000 above that recorded in the previous week; among the remaining towns the rates ranged from 9·2 in Wimbledon, 11·3 in Rotherham, and 11·7 in Dewsbury, to 25·5 in West Hartlepool, 27·9 in Stockton-on-Tees, and 28·5 in Middlesbrough. The principal epidemic diseases caused 357 deaths, which corresponded to an annual rate of 1·1 per 1000, and included 194 from measles, 61 from infantile diarrhoea, 51 from whooping-cough, 42 from diphtheria, 6 from scarlet fever, and 3 from enteric fever. The deaths from measles showed a further increase on the numbers in the seven preceding weeks, and caused the highest annual death-rates of 2·2 in East Ham, 2·9 in Oldham, 3·4 in Walsall, and 6·5 in Warrington. The 805 cases of scarlet fever and the 1476 cases of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 6 below and 4 above the numbers at the end of the previous week. Of the 6140 deaths from all causes in the 96 towns, 196 resulted from violence. The causes of 59 of the total deaths were unascertained, of which 13 were registered in Birmingham, 9 in Liverpool, and 5 in Manchester, but only 1 in London.

**Scotch Towns.**—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death rate was equal to 18·3, against rates declining from 20·1 to 16·7 per 1000 in the four preceding weeks. The 382 deaths in Glasgow corresponded to an annual rate of 17·9, against 19·3 per 1000 in London, and included 24 from whooping-cough, 10 from measles, 6 each from diphtheria and infantile diarrhoea, and 1 from scarlet fever. The 135 deaths in Edinburgh were equal to a rate of 21·2 per 1000, and included 7 from whooping-cough, 4 from measles, and 1 each from diphtheria and infantile diarrhoea.

**Irish Towns.**—The 184 deaths registered in Dublin were equal to an annual rate of 24·0, or 0·3 per 1000 below that recorded in the previous week, and included 8 from measles, 3 from infantile diarrhoea, and 1 from whooping-cough. The 163 deaths in Belfast corresponded to an annual rate of 21·6 per 1000, and included 4 from measles, 2 from infantile diarrhoea, and 1 from diphtheria.

**ABERDEEN DISPENSARY: ANNUAL REPORT.**—The annual report of the Aberdeen Dispensary and Vaccine Institution states that during 1916 4749 cases were dealt with. In the ear, nose, and throat department 54 cases of syphilis, 42 being acquired and 12 congenital, came under observation. There was a deficit financially for the year of 6 guineas.

**THE BELFAST MATERNITY HOSPITAL.**—At the recent annual meeting of this old-established Belfast charity it was reported that 456 intern and 434 extern patients had been treated during the year 1916, with nine maternal deaths. The subscriptions had slightly increased. By raising a special sum of £500 the committee obtained a legacy of £500 left on these conditions. The Rev. Canon Carmody, one of the speakers, referred especially to the delay of the Belfast City Council in adopting a maternal and child-welfare scheme, as had been done by Dublin, Lurgan, Portadown, and Bangor.

## THE SERVICES.

### ROYAL NAVAL MEDICAL SERVICE.

Fleet-Surg. H. B. Beatty has been placed on the Retired List with the rank of Deputy Surgeon-General.  
J. C. McClelland to be Temporary Surgeon.

### ARMY MEDICAL SERVICE.

Lieut.-Col. G. B. Stanstreet, C.M.G., to be an Assistant Director-General (temporary).  
Col. A. P. Blenkinsop, C.B., to be temporary Surgeon-General whilst employed as Director of Medical Services of an Expeditionary Force.

### ROYAL ARMY MEDICAL CORPS.

Temp. Capt. C. B. Dobell to be temporary Major.  
Temporary Lieutenants to be temporary Captains: T. McC. Sellar, E. Ashby, C. H. L. Nixon.

A. G. Sher to be temporary Honorary Captain whilst employed with the British Red Cross Hospital, Netley.

To be temporary Lieutenants: G. Taylor, F. G. M. Simpson, W. G. McConnell, E. G. Bark, A. W. C. Bennett, B. C. Burnett, G. B. Bartlett, A. H. Mandell, A. W. Hall, O. H. Bullock, C. H. Medlock, H. O'Neill, O. F. D. Athrith, I. R. R. Brington, F. G. Chandler, W. J. Purdy, J. E. Foreman, R. M. Danks, J. Rae, S. M. Wilcox, M. W. Danzig, F. Cheal, W. Lumaden, H. D. McCall, M. A. Teale, A. Bevan, A. W. G. Clark, W. Templeton, J. Marshall, C. C. Kennedy, J. M. H. Caldwell.

Officers relinquishing their commissions: Temp. Hon. Major H. L. Tidy, having resigned his appointment at the British Red Cross Hospital, Netley; Temp. Hon. Major C. H. Milburn, having ceased to be employed with No. 2 British Red Cross Hospital; Temp. Capt. M. Litchfield and W. F. L. Day (on account of ill-health), and M. A. Farr; Temp. Lieuts. J. F. Young, J. B. Brown, R. C. Robinson, J. P. Ziervogel.

### SPECIAL RESERVE OF OFFICERS.

Lieutenants to be Captains: J. D. Dyson, H. M. Alexander, C. A. W. Ramsay, F. B. Macaskie, F. Gamm, J. A. Murray, B. Kean, R. Chevassut, J. H. Atkinson, R. Colley, A. K. Robb, J. J. Landers, J. E. Kitchen, E. Lipman, J. C. Attridge.

To be Lieutenants: G. V. Davis (from University of London Contingent, O.T.C.), H. A. G. Dykes, J. B. Mudge.

### TERRITORIAL FORCE.

Major (acting Lieut.-Col.) G. W. Miller relinquishes his acting rank on ceasing to command a Field Ambulance.

Capt. (temp. Major) R. Waterhouse to be acting Lieutenant-Colonel whilst commanding a Field Ambulance.

Capt. (temp. Major) F. Ward relinquishes his temporary rank on alteration in posting.

Capt. (temp. Maj'r) T. H. Chittenden to be acting Lieutenant-Colonel whilst commanding a Field Ambulance.

Capt. R. C. S. Smith, from East Anglian Casualty Clearing Station, to be Captain.

Lieuts. A. E. Crabbe and J. R. Mitchell to be Captains.

R. K. Ellison to be Lieutenant.

Major O. E. Bean relinquishes his commission on account of ill-health.

**Attached to Units other than Medical Units.**—Major W. B. Mackay, C.M.G., from T.F. Res., to be Major. Capt. H. W. Lawing to be Major. Capt. J. A. Simpson relinquishes his commission on account of ill-health. Lieut. J. W. Anderson to be Captain. Capt. A. C. Farquharson to be Major.

### VOLUNTEER FORCE.

J. O. Sankey (late Surgeon-Major, 1/4th Oxford and Bucks Light Infantry) to be temporary Captain and Medical Officer, Oxfordshire Volunteer Regiment, 1st Battalion.

### INDIAN MEDICAL SERVICE.

The King has approved the promotion of the following officers:—Majors to be Lieutenant-Captains: H. S. Peck, T. A. O. Langston. Major to be temporary Lieutenant-Colonel: G. McPherson. Temporary Lieutenants to be temporary Captains: R. C. P. Berryman, A. Williams.

The King has approved the retirement of Major G. King.

We regret an inaccuracy in our Annus Medicus for 1916 (*THE LANCET*, Dec. 30th, 1916, p. 1116, col. 2). It was there stated that Sir C. P. Lukis, D.G., I.M.S., was appointed to act as Director of Medical Services in India, and that the control of the whole medical service, civil and military, was vested in one officer, presumably for the duration of the war. Sir Charles Lukis's tenure of the appointment of Director of Medical Services lasted only until the arrival in India of the present Director of Medical Services, Surgeon General T. J. O'Donnell, in July, 1916.

### DEATHS IN THE SERVICES.

Deputy Surgeon-General A. J. Ferguson, on March 7th at Weymouth, in his eightieth year. He received his first commission in 1858 and took part in the Afghan War of 1878-80 (mentioned in despatches and medal). He retired on half-pay in 1885.

**THE CORNWALL NAVAL HOSPITAL.**—The first annual report of the Royal Naval Auxiliary Hospital, Truro, which has been recently issued, shows that during 1916 1186 patients were admitted, and of that number 1024 were discharged for duty. The average number of occupied beds was 158; the average number of days in hospital was 39. The financial statement was satisfactory. Fleet-Surgeon Andrews is in medical charge of the institution, the honorary surgeons being Mr. L. C. Panting and Dr. H. C. Sharp. Dr. K. C. Chetwood-Aiken is honorary ophthalmic surgeon and Mr. H. M. Sutton is the medical officer.

## Correspondence.

*"Audi alteram partem."*

### THE CLOSURE OF COLOSTOMY OPENINGS.

*To the Editor of THE LANCET.*

SIR.—Mr. P. Lockhart-Mummery's contribution to this subject in your issue of March 10th calls for comment. His assertion that "a temporary colostomy is a rare condition in civilian practice" is far from being correct. The general recognition on the part of surgeons that obstruction in the large intestine is best dealt with by a proximal colostomy, to be followed in suitable cases, after an interval, by resection of the offending segment of the bowel, and, later still, by closure of the artificial anus, has produced many such operations. Moreover, the established value of the three-fold operation in cases of obstruction has led many surgeons to adopt the procedure as a routine practice in dealing with cancerous growths of the colon where obstruction is not a feature of the case. My chief object, however, in writing this letter is to call attention to a method of closing colostomy openings which I have adopted in upwards of 30 consecutive cases without a single fatality and with uniform success. The method was fully described by the late Greig Smith in his work on "Abdominal Surgery," vol. ii., p. 727.

The aim of the operation is to close the artificial anus without opening the general peritoneal cavity, and this is managed by detaching from the parietes, all round the anus, sufficient peritoneum to permit of delivery of the gut through a parietal incision without separating it from its adhesions to the peritoneum. The opening is temporarily closed by a gauze plug. Incisions, each  $1\frac{1}{2}$  inches in length, are made above and below it through the skin and abdominal muscles down to the parietal peritoneum. They begin immediately outside the junction of the skin and mucous membrane, and may be either vertical or oblique. A finger is introduced and the muscles are gently raised from the underlying peritoneum on either side of the incisions. It is best to begin the separation at the end of the incision farthest from the anus because there are no adhesions here. Next the skin all around is divided with a scalpel one-eighth of an inch from its circumference; then with scissors the muscles are separated, taking care not to puncture the underlying peritoneum. When this has been done the colostomy opening and the adjacent colon can be lifted out of the wound to almost any desired extent. Gauze is packed in the wound all around the protruding anus and its muco-cutaneous margin is cut off. The refreshed edges of the anus are now united transversely to the long axis of the bowel by a suture of fine catgut, which should take a firm grip of both the musculo-peritoneal and mucous coats. The gauze packing and the surgeon's gloves are changed, and the area thoroughly cleansed with a stream of warm saline solution. A superimposed suture of fine silk is passed through the peritoneal and muscular coats, so as to bury the catgut suture. The loop of bowel is then pushed inside the abdominal wall, and the peritoneal wound closed by closely placed through-and-through silk-worm-gut sutures. A small rubber drain-tube is placed in the centre of the wound and the usual dressings applied. The drain-tube is removed at the end of 48 hours, and in the vast majority of cases primary union results. Very occasionally a small faecal fistula appears at the end of a week, but in every such case closure follows after a short interval. Every now and then the parietal peritoneum has been punctured, but in no case has this made any difference. Inasmuch as there is nearly always a bridge of healthy bowel wall, varying from one-third to two-thirds of its circumference, on the mesenteric side, there is not the slightest risk of a stricture forming at the site of operation.

Greig Smith's operation is applicable to the vast majority of colostomy openings, including faecal fistulae from gangrenous umbilical hernia and those following operations for gangrenous appendicitis. In view of its safety and the uniform success following its adoption, I may be pardoned for expressing the conviction that enterotomes and similar contrivances should be relegated to surgical instrument museums. Two of my most recent cases were soldiers who had been shot in the abdomen. They were operated on a

few hours later by Captain J. Frazer, who in both cases, after suturing multiple wounds of the intestines, established an artificial anus in the transverse colon. In both the colostomy opening concerned quite one-half of the circumference of the colon. Both healed without suppuration. Mr. Paul Bernard Roth in your issue for to-day describes what he calls "a simpler method of closing colostomy openings." Admitting its ingenuity, one is bound to recognise that it involves the resection of a segment of the colon *within* the peritoneal cavity. This procedure, owing to the relatively septic condition of the mucous membrane and the poor blood-supply as compared with the small intestine is, when every precaution has been taken, one involving a very definite risk to life, and with Greig Smith's operation as an alternative I do not hesitate to say that, in my opinion, it is quite unjustifiable.

Just a word as to after-treatment. Mr. Lockhart-Mummery recommends that the bowels should be made to act daily after the operation. Surely this is bad advice. Here, more than elsewhere, one of the essentials to good healing is rest. Care should be taken to have the bowels well emptied before operation, but thereafter for a few days the less peristalsis the better. As a matter of fact I never give an aperient in these cases until the end of the first week.

I am, Sir, yours faithfully,

SINCLAIR WHITE,  
March 17th, 1917. Professor of Surgery, Sheffield University.

*To the Editor of THE LANCET.*

SIR.—In your issue of March 10th Mr. P. Lockhart-Mummery describes two methods of closing temporary colostomy openings. He recommends the use of the enterotome or alternatively direct suture after intraperitoneal resection. Of the enterotome I know nothing. There is little temptation to employ a method which relies for success on imperfectly regulated pressure-necrosis when better results can be obtained by measures equally safe and more precise.

I have closed a number of these openings with unqualified success both in military and civil practice and have never found it necessary to subject a patient to whatever risk may be attached to intraperitoneal resection or suture. The mode of procedure adopted has been direct extraperitoneal suture with preliminary use of the drainage-tube device of Mitchell Banks. The method is described in Greig Smith's "Abdominal Surgery," 1897, vol. ii. The description is so full and the modifications introduced in practice so trivial that nothing further than the reference is required. It would appear that this extraperitoneal method is neither so well known nor so widely practised as its merits deserve. It can confidently be recommended as of universal application, absolutely safe, and absolutely certain.

I am, Sir, yours faithfully,

Harley-street, W., March 18th, 1917. PERCIVAL P. COLE.

### RATIONS GUIDE: FOOD REQUIREMENTS OF CHILDREN.

*To the Editor of THE LANCET.*

SIR.—In the admirable series of recommendations on rationing and "How to Save Food" recently issued by the Food Controller, there are certain recommendations made with regard to the diet of children that appear to call for revision. The recommendations of the Food Controller are based on the following statement: "Children need plentiful food. A child of 8 needs half as much as a grown-up; a girl of 12 three-fifths as much; a girl of 16 needs as much as her mother, and a boy of 16 may eat as much as his father."

I am aware that this represents the teaching of standard text-books on the subject, though I have never been able to ascertain the exact data on which the original recommendation by Atwater was founded. I venture to think, however, that this teaching is wrong and is to be deprecated as a guide at the present time. My opinion is based both on practical observation and special investigation. The food requirements of a healthy schoolboy, say of 12 years, can be fairly accurately gauged from observation and a comparison with those of his parents on the same régime. If this test be applied, it can, I think, safely be said that the average boy of 12, in a household of the professional class, eats as much as his father. Corroborative information is obtained

from the laboratory standpoint. Some time ago I made a detailed study of the actual amount consumed by healthy children in a series of medical families, every precaution being taken to ascertain the exact amount of food consumed. The ages of the children ranged from 4 to 6 years. The result showed a daily average of: Protein, 71 grms.; fat, 67 grms.; carbohydrates, 198 grms.; the total calories amounting to 1725. The supply of protein—the main food element in the dietary of children—consumed by a child of 6 years and under is shown to be greater than that allowed for by the Food Controller for a boy of 12.

Fully grown subjects may with safety and positive advantage to health accept the standard laid down for the average adult by the Food Controller. It is, however, not advisable to restrict the feeding of children to the extent indicated in the Food Controller's recommendations. A wise economy in regard to the feeding of children should be looked for in the selection of foodstuffs rather than in a reduction of quantity below the pre-war standard.

I am, Sir, yours faithfully,

Edinburgh, March 17th, 1917.

CHALMERS WATSON, M.D.

## THE DIFFERENTIATION OF HEART MURMURS.

To the Editor of THE LANCET.

SIR.—I fail to understand why Professor David Drummond, in his letter in your issue of Feb. 17th, should think it strange my questioning his remarks on "The Differentiation of Heart Murmurs." In the whole range of his cases I note he gives no post-mortem results, and in the absence of such surely our opinions are apt to be wide of the mark. May I remind Professor Drummond of a very interesting article with post-mortem results in THE LANCET, 1895, vol. ii., by Dr. A. G. Phear, quoting Dr. Ringe's cases. Professor Drummond apparently considers that murmurs which disappear are due to vibrations of the chest wall. In answer to this, I think Dr. Theodore Fisher rightly observes, "It is difficult quite to gather his meaning." For, as Dr. Fisher says: "The chest wall being the medium which, through the stethoscope, conveys murmurs to our ears must vibrate in all cases, but neither with functional nor organic disease can murmurs, it seems to me, originate in the chest wall." I trust I am not unduly trespassing on your valuable space in prolonging this discussion, and I would like to assure Professor Drummond I am more anxious to learn than in any way to put forward my own ideas.

I am, Sir, yours faithfully,

Bournemouth, March 19th, 1917.

A. KINSEY-MORGAN.

## ACUTE DILATATION OF THE STOMACH FOLLOWING GASTRO-ENTEROSTOMY.

To the Editor of THE LANCET.

SIR.—The question as to the cause of acute dilatation of the stomach following gastro-enterostomy raised by Dr. F. Godfrey in THE LANCET of March 3rd is a very interesting one, and is my excuse for publishing the following experience.

About six years ago I performed posterior gastro-enterostomy on a man aged 40 years, for duodenal ulcer and as there was a suspicion of gall-bladder trouble, the incision was made about one and a half inches to the right of the mid-line. The patient, unfortunately for the procedure, had a well-developed abdominal wall, with powerful muscles which no effort of the anaesthetist could relax; and it was found when the stomach and jejunum were drawn out and approximated for suture that there was a little tension which necessitated a slightly firmer grip of the clamps than is customary. The operation was completed, following the Moynihan technique. All went well until the fourth day, when the patient vomited slightly and complained of discomfort in the abdomen. On examination I found a distended splashing stomach. A tube was passed and about four pints of watery fluid siphoned off, which gave marked relief. Next day the procedure had to be repeated, with a similar result. The patient now looked ill and shrunken, although he was absorbing a large quantity of saline per rectum, and fearing a kink or other cause of obstruction I decided to reopen the abdomen. On doing so I found the anastomosis perfect, but the intestine on either side for a few inches was contracted, rigid, and friable, it was much discoloured and the coats

thickened by inflammation. The stomach near the anastomosis was similarly affected. It was obvious that peristalsis in this area was quite impossible and the condition of the patient was thus easily accounted for. I have no doubt the state of the intestine and stomach was caused by the clamp pressure and possibly by tension on the mesentery during the operation. The abdomen was closed and the stomach-tube passed frequently to prevent accumulation until the intestine recovered tone, which it did about the eighth day. The patient then quickly recovered.

I saw him about a year afterwards; he was in excellent health and joined the Army at the beginning of the war. I have no doubt the stomach-tube saved his life. I have not heard or read of clamp pressure as a cause of atony, but I am convinced that this case is not unique, and it helps to explain at least some of the cases where vomiting occurs on the third or fourth day and the patients recover after the free use of the stomach-tube.

I am, Sir, yours faithfully,

Clonmel, March 14th, 1917.

P. J. BYRNE, F.R.C.S. Ire.

## TUBERCULOSIS AND THE WAR.

To the Editor of THE LANCET.

SIR.—After reading Dr. H. A. Ellis's letter on the above subject in THE LANCET of March 10th it occurred to me that it gave an explanation of the uselessness of treating patients in sanatoriums, for it would seem that a sanatorium is regarded by many as a place for throw-outs from dispensaries. If, of course, this is the intention of these institutions it is useless to deplore the absence of early cases for treatment, as the dispensary would appear to be a very efficient sieve, preventing the treatment of pulmonary tuberculosis until the patients were chronic, and probably chronics which had become acute. It is quite clear to me that if a man is unable to do anything but light work he should be sent to a sanatorium at once in order that he may be permanently cured. I would suggest, therefore, it might be a good plan to commence sending cases in Class I. at once, without the intervention of a dispensary, to properly conducted sanatoriums. I have never here found the least difficulty in treating discharged soldiers for periods of five months: my only difficulty is that many have been kept out when in what may be called Class I., with deplorable results. The least we can do for our soldiers is to provide them with real sanatorium treatment at a stage when it is possible to cure them permanently.

I quite agree with your annotation that the general practitioner should be the chief factor in looking after the tuberculous; whether the visits of a tuberculosis officer to practitioners will do any good will, of course, depend on the capacity and training of that gentleman.

I am, Sir, yours faithfully,

EDWARD E. PREST.

Ayrshire Sanatorium, New Cumnock, March 12th, 1917.

## AN APOLOGY.

To the Editor of THE LANCET.

SIR.—We have the concurrence of the solicitors to the Evening Standard in requesting you to give space in THE LANCET to the following expression of explanation and apology to Dr. Henry Dutch which appeared in the issue of the Evening Standard dated March 2nd:—

### THE WHITE CITY CASE.

An Explanation and an Apology to Dr. Dutch.

Our attention has been called to an unfortunate inaccuracy in the report of these proceedings appearing in our issue of February 27th. From our report it would appear as though Mr. Muir said that Dr. Dutch had told Sauge "to drop the Sergeant-Major a quid."

As a matter of fact, Mr. Muir, in making the statement quoted above, was referring to quite a different person and made no aspersion whatever upon Dr. Dutch. We much regret the inaccuracy in our report, and we are pleased to take the earliest opportunity of correcting any misapprehension and express our unqualified apology to Dr. Dutch for any annoyance caused to him.

We shall therefore esteem it a favour if you will publish this letter in your next issue.

We are, Sir, yours obediently,

HEMPSONS,

Bedford House, 33, Henrietta-street. Solicitors for Dr. Henry Dutch. Strand, March 15th, 1917.

## Obituary.

### FREDERICK W. HALLIDAY, M.R.C.S., L.R.C.P. LOND.

THE profession in Leeds is the poorer in many ways by the untimely death of Mr. F. W. Halliday, which occurred on March 5th at his house in Wortley, the village in, or near, which he was born, and in which almost the whole of his professional life was passed. He was educated at the Medical School in Leeds, and soon after qualifying he entered the service of the Peninsular and Oriental Steam Navigation Company, and served as ship surgeon on most of their routes in the East, retaining lively memories of India and Japan for the rest of his life. He had a widespread general practice, which he conducted with success; his kindness and courtesy were unfailing to all his patients—rich and poor alike.

During the last few months of his life he acted as medical officer to a Filling Factory, where he had the medical supervision of some 14,000 female operatives, and here his work was of the same thorough and considerate character that he displayed in private practice, and it is not too much to say that he secured the affectionate regard of the workers as well of the managers of the huge establishment. His personal friends have learned of his death in the prime of life with a great sense of loss.

### WALTER DURET AUBIN, M.B., C.M. EDIN.

LIEUTENANT-BAILIFF AND JURAT, ROYAL COURT OF JERSEY.

THE death is announced of Dr. W. Duret Aubin, in his sixty-ninth year, at his residence in Jersey on March 9th.

After receiving his early education at the Lycée of Coutances, Duret Aubin entered the medical school of Edinburgh University, where he was known as a hard-working and successful student. He graduated in 1870, just at the time the Franco-Prussian War broke out, and volunteered for service in France in the International Red Cross Society. At the close of hostilities he was awarded the Cross of that society and, later, the commemorative medal of the French Republic. Returning to Jersey, Duret Aubin settled down in practice at St. Heliers, his personal qualities soon obtaining for him an extensive general practice. At this time he entered the Island Militia as an assistant surgeon, eventually attaining the rank of Surgeon Lieutenant-Colonel. In 1895 he was elected as a Deputy for St. Heller in the island legislature and did much useful work in that position. He was instrumental in placing the local Pharmacy Act on the Statute Book and he piloted through the States other measures for the good of the community. Patriotic and full of enthusiasm at heart, he was nevertheless a courteous and conciliatory debater. In 1899 he was called to the judicial bench, manifesting there the industry, patience, and critical acumen which had marked his previous career. By the time he had risen to be deputy chief magistrate (Lieutenant-Bailiff) he had gradually relinquished medical practice, with a view of working in his public capacity, but his other activities were numerous. For many years he was President of the Hospital Committee, as also of the Jersey Boys' Home, while many local societies found in him a friend and supporter. In all his public work Durat Aubin was guided by a deep sense of duty, and in this connexion a friend of his writes: "It has sometimes been urged that medical men, as a class, do not take their proper share in public work. As a life-long friend of Durat Aubin, I may be permitted to adduce him as a conspicuous instance of one to whom this did not apply."

Dr. Duret Aubin was twice married. He leaves a widow, two daughters, and a son.

THE name of Dr. Artur Pappenheim is to be added to the already considerable list of distinguished German medical men who have fallen a victim to typhus. Dr. Pappenheim was lecturer on diseases of the blood in Berlin University and editor of *Folia hematologica*. He was in his forty-seventh year.

THE LATE MR. ISAAC USHER.—One of the oldest and best-known practitioners in co. Dublin, Mr. Isaac W. Usher, recently lost his life in a tragic manner, being knocked down in the street by a motor-car. He was nearly 80 years of age, and had been a highly respected medical practitioner.

## The War.

### THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue:—

#### Killed.

Lieut. T. W. Jones, R.A.M.C., attached Northumberland Fusiliers, received his medical education at the University of Liverpool and qualified in 1908. He had held appointments at the Northern Hospital, at the Maternity Hospital, and at the City Hospital, Liverpool, and at the time of joining up was medical officer of health, school medical officer, and medical superintendent of the Fever Hospital, Wrexham.

Lieut. A. I. Miller, R.A.M.C., attached Royal Field Artillery, was educated at Edinburgh University and qualified in 1905. Prior to joining the R.A.M.C. in September last he was in practice at Stourbridge, Worcestershire.

#### Died of Wounds.

Lieut.-Col. M. L. Williams, Australian Army Medical Corps, qualified M.B. at Melbourne in 1908, and was in practice at Bendigo, Victoria, prior to joining the Expeditionary Force.

Lieut. J. M. Hammond, R.A.M.C., was a medical student at St. Bartholomew's Hospital, London, and qualified in 1908. He had held appointments at the West London and at St. George's Hospitals, and was in practice at Bournemouth when he joined the R.A.M.C. in July last.

#### Died.

Lieut. F. G. Heard, R.A.M.C., was educated at Edinburgh University and qualified in 1889. He had held appointments at the Free Dispensary, Edinburgh, and at the Rotunda Hospital, Dublin, and at the time of joining the R.A.M.C. was in practice at Undercliffe, near Bradford, where he also held public appointments.

#### Wounded.

Capt. S. J. Linzell, R.A.M.C.

Capt. G. D. Newton, R.A.M.C., attached Royal Lancaster Regiment.

Lieut. A. Y. Dabholkar, I.M.S.

Lieut. E. R. Daboo, I.M.S.

*Previously reported believed taken Prisoner at Kut-el-Amara, now reported Prisoner of War in Turkish Hands.*

Capt. R. C. Clifford, I.M.S.

### DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

Private J. M. Furnivall, Duke of Cornwall's Light Infantry, youngest son of Dr. H. W. Furnivall, of Woodbury, Devon.

Lieut. R. N. Irwin, Gloucester Regiment, younger son of Dr. S. Irwin, of Olveston, Gloucester.

Second Lieut. C. F. Umney, Dorset Regiment, elder son of Dr. W. F. Umney, of Sydenham, Kent.

Second Lieut. H. G. Downes, Royal Engineers, only son of Dr. H. Downes, of Hornsey, London.

### THE HONOURS LIST.

The following awards to medical officers in connexion with the operations in Mesopotamia are announced:—

#### Distinguished Service Order.

Capt. Allan Watson, R.A.M.C.

#### Military Cross.

Temp. Lieut. A. Y. Dabholkar, I.M.S.

Temp. Capt. J. Low, R.A.M.C.

Temp. Capt. C. O'Brien, R.A.M.C.

### MENTIONED IN DESPATCHES.

The name of the following medical officer should be added to the names published in THE LANCET of Nov. 13th, 1915, in connexion with operations in the Dardanelles:—

Capt. M. F. Reaney, I.M.S. (deceased).

HONITON (DEVON) V.A.D. HOSPITAL.—The mayor of Honiton recently opened a new "open-air ward" containing 30 beds, which has been added to the V.A.D. Hospital. The institution now contains 50 beds.

**CONFERENCE SUMMONED BY MR. NEVILLE CHAMBERLAIN.**

The Conference summoned by Mr. Neville Chamberlain, Director-General of National Service, to consider the organisation of the medical profession with a view to meeting the needs of the military and civil population in existing circumstances, was opened on March 14th and sat on March 15th also, under the chairmanship of Sir Donald MacAlister. We published last week a list of the representatives of the Central Medical War Committee, the Scottish Medical Service Emergency Committee, and the Committee of Reference of the English Royal Colleges, the three bodies through whom the Services have drawn their supply of medical officers for the war, who were present at the conference. The subjects under discussion were: First, the question of whether service to be given by members of the medical profession was to be voluntary or compulsory; secondly, what arrangements should be made for the collection and distribution of fees or other form of remuneration in cases where doctors leave their own practices or take on the practices of others; thirdly, what arrangements should be made: (a) centrally and (b) locally, for redistribution of medical men; and fourthly, what should be the relations between any central executive or advisory body representing the profession and the Department of National Service.

The report of the representatives of the Central Medical War Committee upon the proceedings of the Conference was received by that Committee during the week, but no set discussion followed, it being understood that the views of the Conference were largely those already expressed in the published resolutions of the Committee.

We are precluded from suggesting more definitely what actual course will be pursued, or what form any necessary legislation may take, until the Director-General of National Service is able to communicate the view of his Department. But as far as the demand on the medical profession is concerned, a largely increased number of medical officers is now stated to be required for the Army; and, as the War Office contemplates not being able to keep back any officers of military age from general service, it is clear that many openings for those above that age may be created.

**THE MOBILISATION OF THE MEDICAL PROFESSION.**

A meeting of registered medical practitioners in Glasgow and the West of Scotland will be held in the Faculty Hall, St. Vincent-street, Glasgow, on Tuesday next, March 27th, at 4.30 P.M., when the opinion of the medical profession will be invited upon the following points: (a) Does the meeting approve of the principle of the immediate and compulsory mobilisation of the whole nation (due regard being paid to age, training, and circumstances), to secure the successful and rapid conclusion of the war? (b) Does the meeting approve of the medical profession being so mobilised, in advance of the community? And (c) if the medical profession is to be mobilised, is the meeting satisfied with the arrangements which already exist, centrally and locally, for the redistribution of medical men and for administrative purposes generally?

**EDUCATIONAL FACILITIES FOR BRITISH PRISONERS OF WAR.**

At a representative and largely attended Conference of Examining Bodies in Great Britain held on March 15th at the Board of Education under the presidency of Mr. A. T. Davies, C.B., chairman of the British Prisoners of War Book Scheme (Educational), it was unanimously decided, on the motion of Sir Edward Busk, Chairman of Convocation of the University of London, to approve proposals for the recognition of the studies pursued by prisoners during their internment. Steps are being taken to give effect to these proposals, and various examining bodies, including most of the universities, have already intimated their willingness to recognise work done and examinations passed in the camps and to extend to the men, on their return, facilities for sitting for examinations under conditions which will take account both of their special circumstances and their needs. A message was read from the President of the Board of Education, in which Mr. Fisher expressed sympathy with the objects of the Conference and his belief that the result of its efforts would prove a great encouragement to the men to use wisely

and well the time of their captivity, and, further, would be of material assistance to them on their return to this country. It is intended that the decision arrived at shall be communicated as soon as possible as "a message of encouragement and hope" to the various internment camps in enemy and neutral countries. Meantime it was suggested that friends and relatives of student prisoners might do them a service if, when writing to them, they will draw their attention to the steps in this connexion which are being taken on their behalf.

**RED CROSS WORK IN THE COUNTY OF LONDON.**—In his report for January the county secretary of the British Red Cross Society states that a lecture given by Colonel James Cantlie to women conductors of the London General Omnibus Company was greatly appreciated by them, and that the company have made arrangements for a regular course of lectures to their women employees in first-aid work. A new division of the Red Cross Society has been formed at Southwark. Mention is made of the good work done by different detachments at the recent explosion in a munition factory. In the examinations held during the month 186 candidates passed and 26 failed in first-aid, while 82 passed and 5 failed in home nursing.—In the February report all members of the V.A.D. are exhorted to consider themselves as recruiting agents and to enrol as many members as possible. The difficulty in supplying an adequate number of lecturers for first-aid and home-nursing courses is to be met by asking those desirous of qualifying for Red Cross work to attend lectures at the College of Ambulance (3, Vere-street), where full facilities are afforded. In the February examination 131 candidates passed and 21 failed in first-aid, 93 passed and 9 failed in home nursing, while all of 3 passed in hygiene. The total number of candidates for examination under the central examination scheme inaugurated in July, 1916, was 1324 up to the end of last year, the percentage of passes being 88.

**FRENCH CONSERVATIVE SURGERY.**—Dr. Louis Menciére, a paper by whom on the treatment of gas gangrene when he was *médecin-chef* of the Hôpital de la Compassion, Rheims, was published in THE LANCASTER of Sept. 11th, 1915, has just been made Chevalier of the Legion of Honour and *chirurgien-chef* at the Grand Palais Hospital in Paris. His mission is to continue his scientific researches and to popularise his method of treatment of war wounds. Professor Sartory, who occupies the chair of chemistry and bacteriology of the Faculty of Medicine of Nancy, is associated with him, and the Army laboratory at the Invalides has been placed at their disposal. Dr. Menciére's well-earned promotion is a direct result of the success of his conservative methods in saving numberless amputations, which won the approval of General Nimier, *médecin-inspecteur* of the VI. Army.

**WAR DRAWINGS.**—Mr. Muirhead Bone's recent drawings in France are being reproduced by authority of the War Office under the title of "The Western Front." In addition to this publication a selection of drawings will be reproduced on a larger scale (20 in. x 15 in.) to give full effect to the artist's work. "War Drawings" will consist of a series of parts each containing ten illustrations. The drawings will appear as nearly as possible in facsimile, printed in one, two, or more colours according to the character of the originals. It will be possible to obtain separate plates from this publication.

**HOT WATER FOR THE TROOPS IN THE FIELD.**—An illustrated pamphlet issued by the British Berna Motor Lorries, Limited (Waterloo-place, S.W. 1), gives details of the type of bath caravan manufactured by them, one of which has been presented by the Wounded Allies Relief Committee to the Belgian Army. The caravan carries 12 enamelled steel baths and a boiler capable of yielding hourly 50 to 60 baths of 20 gallons each at a temperature of 110° F. More than 500 men can thus within a period of 12 hours enjoy a separate hot bath under conditions of comfort at a cost of approximately 1d. per bath. The caravan provides accommodation for two men, while at one end are drying closets and at the other disinfecting chambers. The bathing-tents or huts are formed of canvas sheeting attached to the edge of the caravan roof on the one side and to light poles on the other, the sides being also covered in with canvas:

**BATH MILITARY HOSPITAL.**—Accommodation is being provided at the Bath Military Hospital for 500 additional patients.

**MILITARY HOSPITAL FOR CORNWALL.**—The beautiful house and grounds of Tregeanna, Camborne, are being fitted up as an auxiliary military hospital. Accommodation will be provided for 50 beds.

**AMERICAN WOMEN'S HOSPITAL FOR OFFICERS.**—This hospital, which owes its origin to the American Women's War Relief Fund, was opened on Wednesday, at 98 and 99, Lancaster-gate, London, by the United States Ambassador. The hospital provides 45 beds under a resident medical officer, Dr. R. H. Browne-Carthew. The same fund has provided the War Hospital of 250 beds at Paignton, Devon.

**A HOSPITAL EXTENSION AT HOVE.**—An addition has been made to the already numerous military hospitals and Red Cross institutions at Hove by the opening in Palmeira-square of an institution for the treatment of paralysed and nerve-affected soldiers. The new hospital is really an extension of the neurological department of the 2nd Eastern General Hospital. It is well fitted up for the reception of 25 patients, and has been called after the founder, Lady George Nevill.

**TRAINING OF DISABLED SOLDIERS**—Replying to questions in the House of Commons on March 19th, Sir A. Bosawen, Parliamentary Secretary to the Pensions Ministry, stated that every endeavour was being made to put the treatment and training of disabled men on a systematic basis in every part of the Kingdom. A joint committee had already been formed in Lancashire for the purpose of pooling facilities, and a similar committee was just being set up in Yorkshire. If proper institutions were not available the Ministry would not shrink from founding new ones. He laid special emphasis on the proposal, constituting a new principle, that pensions would not be reduced as earning capacity increased.

## Medical News.

**UNIVERSITY OF LIVERPOOL.**—At examinations held recently the following candidates were successful:—

**M.B., Ch.B.**—Second Examination, Part B: Mary H. Wild. Final Examination, Part I.: L. Farris, P. E. Gorst, G. R. James (distinction in Pathology), and V. E. Jones. Part II.: W. M. Jones (distinction in Forensic Medicine and Toxicology) and Public Health), and F. A. Prosser. Part III.: E. S. Stubbs (first-class honours and distinction in Obstetric Surgery), I. J. Lipkin (second-class honours and distinction in Obstetrics), P. B. Pinkerton (second-class honours and distinction in Obstetrics), M. Azer, Constance M. Edwards, A. J. B. Griffin, Ruby E. McBirnie, R. Nixon, C. V. Pearson, and R. C. Watts.

**Licentiatehip in Dental Surgery.**—Second Examination, Part I.: I. W. Brown, C. L. Wade, and H. G. Watkin. Part II.: C. L. Wade, H. G. Watkin, and E. H. Williams. Third Examination, Part I.: E. W. H. Owen, F. J. Parle, and E. O. Roberts. Part II.: H. Brown, R. B. Ginsberg, and F. Lockwood. Final Examination: A. Hesselberg and P. Moses.

**ROYAL COLLEGE OF SURGEONS OF EDINBURGH.**—At the recent Dental Examinations just concluded the following candidates passed the First Dental Examination:—

Andrew John Molynaux and Egbert John Charles Steyn.

The following passed in the subject of Chemistry and Physics:—

Donald Skinner and George Izett Alexander.

The following passed the Final Examination and were granted the diploma L.D.S., R.C.S. Edin.:—

Petrus Jacobus Hugo le Roux, South Africa; William Graham Bowie, Edinburgh; Leonard Walter Blazey, London; Ulrich Oscar Gottlieb Reinecke, Orange Free State; John McCurdy, Co. Antrim; and Meindert de Villiers, South Africa.

**ROYAL MEDICAL BENEVOLENT FUND.**—The annual general meeting of the supporters of the Fund took place on March 13th, at 11, Chandos-street, W., Mr. J. H. Morgan being in the chair. It was announced that Sir John Tweedy had resigned the Presidency, which he had held for 10 years, during which had occurred both the incorporation of the Fund and the establishment of the Guild. The thanks of the Fund were given to him for his services, and Dr. Samuel West was elected President in his place, after a service of 22 years as honorary treasurer. To Dr. West the Fund is indebted for the introduction of the present system of

accounts, while during his office the output in charity has doubled, the invested property has risen from £52,000 in 1896 to over £102,000, and the number of annuities has risen from 108 to 161. Colonel Charters J. Symonds was appointed treasurer and Dr. G. Newton Pitt re-elected honorary secretary; and the following new members were added to the committee: Dr. J. Fawcett, Dr. Leonard Guthrie, Dr. W. S. Colman, and Mr. Guy Elliston. Cordial thanks were passed to the honorary auditors, Messrs. Deloitte, Plender, and Griffiths, and to the Press, and especially to the editors of the *British Medical Journal* and *THE LANCET* and to Mr. Guy Elliston of the British Medical Association. The annual report showed that the total subscriptions and donations amounted to £2067, a decrease of £176 compared with last year. The amount distributed in relief was £2503, the excess being made up out of the reserves. The annuity department expended £3119, £91 more than last year, and the number of annuitants was increased by 12. The usual Christmas gift of £1 was sent to each annuitant, and a similar gift to the most deserving grantees, the two grants amounting to £270. The chief event of the year was the War Emergency Appeal, the object of which was to assist medical men, on their return from the war, to recover their position which had suffered by their absence. About £4000 were received, but this is far less than will be required for the object in view, and the public as well as the profession is strongly urged to support this Fund, which is the only one of its kind for the medical profession. £6100 had been invested in the War Loans, part being by the transfer of investments, but £2100 was new money. The annual report of the Guild was ordered to be published with that of the Fund.

At the meeting of the Committee held the same day 20 cases were considered, and £277 4s. voted to 17 of the applicants. The following is a summary of some of the cases received:—

Widow, aged 49, of L.R.C.P. Irel. who practised at Great Yarmouth and died in 1915. Was left practically without means, and owing to ill-health is unable to earn a living. At present staying with friends, who cannot continue to help her permanently. Voted £6 in six instalments.—Widow, aged 29, of M.B. Lond. who was a Medical Missionary in China and died in June, 1916. Applicant left with two children, ages 2 and 4, and only £35 per annum. Another charity has promised £20 per annum. Applicant wants some help to provide training for herself, so that she will be able to earn a living. Voted £2, and referred to the Guild.—Daughter, aged 50, of M.D. Dub. who practised at Cambridge and died in 1904. Applicant was a teacher in a boarding school, and in 1913 took over the school, but the venture has not been a success, owing mainly to bad health and bad eyesight, which is gradually getting worse, having lost the sight of one eye. Is now in great financial difficulty. Voted £10.—Widow, aged 62, of L.R.C.P. Edin. who practised at Wigan and died in 1913. Endeavours to make a living by letting rooms in the summer, but last year was not successful. Only son joined the Army and the allowance of 9s. 3d. per week is all she has to definitely depend upon. There are a few small debts still owing from her husband's practice, but these are almost all collected now. Wants help towards her rent. Voted £10.—Wife, aged 38, of M.R.C.S. Eng. who practised at Bournemouth, but is now in an asylum. Applicant has no means and is suffering from advanced tuberculosis. Her three children are provided for at present. She has a little help from other charities, but not sufficient to meet her requirements. Relieved twice, £37 10s. Voted £18 in 12 instalments.—Widow, aged 68, of M.B. Edin. who practised at Bolton and died in 1905. Only certain income £9 5s. The bulk of her money was lost through a defrauding trustee. Has three children, two married and unable to help, and one son who lives at home, but only earns £1 per week. Relieved once, £12. Voted £12 in 12 instalments.—Daughter, aged 56, of M.R.C.S. Eng. who practised at Manchester and died in 1896. Owing to ill-health applicant had to give up her work as a clerk. Only income a pension from her late employers of 8s. per week. Relieved twice, £26. Voted £15 in 12 instalments.—Wife, aged 51, of L.R.C.P. Irel. who practised at Chatham, and left his wife some years ago, with three children to bring up. The children are now getting on well, the eldest daughter having recently taken a situation, but not able to help much, as she is away from home. The eldest son is in the Army and the youngest at Epsom College. Applicant unable to work owing to eye trouble. Relieved four times, £38, and helped by the Guild. Voted £12 in 12 instalments.—Daughter, aged 53, of M.R.C.S. Eng. who practised in London, and died in 1895. Applicant's health is very indifferent, and although she has tried various kinds of employment her health will not permit her to continue. At present staying at a home of rest. Relieved five times, £63. Voted £12 in 12 instalments.—Widow, aged 62, of L.R.C.P. Edin. who practised at Dumfries, and died in 1909. Applicant was left with four children, two of whom are now in the Army, and the youngest daughter only earning 23s. a week and not living at home. Applicant unable to work owing to ill-health. Relieved eight times, £80. Voted £12 in 12 instalments.—L.R.C.P. Lond. and L.S.A. Lond., aged 89 (married, his wife 83), who practised at Wandsworth. Owing to age not able to do much work. Some years ago lost practically all his practice through the removal of a large railway works from near his house, and from which most of his practice came. This, with the coming of the National Insurance Act, ruined his practice. In great financial difficulties. Relieved once, in 1913, £12. Voted £26 in 12 instalments.—Widow, aged 48, of M.B. Edin. who practised at Glasgow and died in 1912. Applicant was left totally unprovided for, with seven children. The two eldest are now married, two others are in the Army, one daughter a clerk earning 10s. per week, and the others are at school. Income from other charities £22, and from children £41 12s. Relieved five times, £92. Voted £20 in 12 instalments.—Daughter, aged 50, of M.D. Glasg. who practised at Hawtry and died in 1872. Applicant lives in own house. Endeavours to make a living by taking in paying guests, but as

the lives on the East Coast has not been successful since the war commenced. Relieved twice, £20. Voted £10 in two instalments.—Widow, aged 53, of M.B. Aberd. who practised at Belfast and Dublin and died in 1913. Was left unprovided for with four children. The eldest son was in his second year as a medical student when the war broke out and had to join the Army. He has been wounded and is now invalided out of the service and is continuing his medical studies. The other children only earning very little. Relieved once, £5. Voted £15 from the War Emergency Fund.—Widow, aged 63, of L.R.C.P. Irel. who practised in London and died in 1916. Her husband was for some years a pensioner of the Fund and the applicant was left quite unprovided for and makes living by letting rooms. Relieved twice, £14. Voted £15 in 12 instalments.—Widow, aged 59, of M.D. Edin. who practised in Cumberland and died in 1903. Endeavours to make a living by taking in boarders, but does not get sufficient. Has four children, all married and unable to help. Relieved ten times, £120. Voted £15 in 12 instalments.

Subscriptions may be sent to Dr. Samuel West at 11, Chandos-street, Cavendish-square, London, W., who will act temporarily as honorary treasurer during the absence on duty of Colonel Charters Symonds.

**RED CROSS PHYSICAL CLINIC.**—At the Red Cross Physical Clinic for Wounded and Disabled Officers (26, Great Portland-st., W.1) on Thursday and Friday next, March 29th and 30th, a short account of the methods of treatment and of the measuring instruments employed in testing functional efficiency will be given on both days at 4 P.M. Admission will be free to members of the medical profession.

**ROYAL ABERDEEN HOSPITAL FOR SICK CHILDREN.**—The fortieth annual report of this hospital shows a total of 1871 cases treated during the year, 759 as in-patients and 1112 as out-patients. Of these 759 in-patients 590 were discharged as cured, 50 died, and 3 improved. The work of the hospital has again been carried out at Keppelstone. The open-air ward, accommodating 26 cases, opened in May, 1916, has proved an unqualified success. The gross ordinary expenditure has exceeded the ordinary income for the year by £338.

**CENTRAL MIDWIVES BOARD.**—Special meetings of the Central Midwives Board were held at Queen Anne's Gate Buildings, Westminster, on March 13th and 14th, with Sir Francis H. Champneys in the chair. A number of midwives were struck off the Roll, the following charges, amongst others, having been brought forward:—

That being in attendance as a midwife at a confinement and having explained that the case was one in which the advice of registered medical practitioner was required, the midwife did not hand to the husband or the nearest relative or friend present the form of sending for medical help properly filled up and signed by her, in order that this might be immediately forwarded to the medical practitioner, as required by Rule E. 20, and the advice of a registered medical practitioner having been sought, she neglected to notify the Local Supervising Authority thereof, as required by Rule E. 22(1)(a). The midwife neglecting to take and record the pulse and temperature of the patient at each visit, as required by Rule E. 14, and neglecting to enter true records of the patient's pulse and temperature in a note-book or on a chart carefully preserved, as required by Rule E. 14. A patient suffering from serious rupture of the perineum, the midwife did not explain that the case was one in which the attendance of a registered medical practitioner was required, as provided by Rule E. 21(3). The midwife not being scrupulously clean in every way, including her person, clothing, appliances, and house, as required by Rule E. 2, and she did not on each occasion when attending her patient's wear a clean dress of washable material, as required by Rule E. 2, and was guilty of misconduct in recording pulses and temperature purporting to be those of patients whom she had attended, when in fact she had taken no such pulses and temperatures. Being in attendance at a confinement the midwife did not on each occasion disinfect her hands and forearms before touching the patient's generative organs or their neighbourhood, as required by Rule E. 4; she neglected to make use of the anti-septic precautions for washing the patient's external parts and swabbing them with an efficient anti-septic solution, as required by Rule E. 8(a). A child suffering on the third day from inflammation of and discharge from the eyes, the midwife did not explain that the case was one in which the attendance of a registered medical practitioner was required, as provided by Rule E. 21(5). A midwife having been convicted on an indictment alleging that being a person over the age of 16 years having the custody of a child, she neglected the child in a manner likely to cause injury to its health, and had been sentenced to six months' imprisonment. A midwife having been convicted and sentenced to 12 months' hard labour for that she did unlawfully kill a woman.

**THE HEALTH OF MUNITION WORKERS.**—At the Royal Institute of Public Health on March 14th Mr. Edgar L. Collis, Medical Inspector of Factories, outlined the problems of modern industrial hygiene as presented to the Health of Munition Workers' Committee. The work of this committee has been based on the following principles: (1) Proper alternation of rest and work; (2) the supply of sufficient and nourishing food on which the efficiency of the worker largely depends; (3) the provision of proper lighting, temperature, fresh air, and protection against disease; (4) the fact that the physical organisation of woman, though weaker than that of man, is more suited to continued effort; (5) the necessity of providing human beings during immaturity with shorter periods of activity and longer periods of rest than are required by adults. After referring to the good work done by Welfare Supervision Committees (*vide THE LANCET*, Jan. 6th, p. 25), the lecturer concluded by stating

that many of these problems under consideration, whether concerning the employment of men, women, or children, have only recently been grappled with, and it was amazing that the present stage of industrial progress should have been reached without any serious attempt to solve them. Had the attempt been made earlier much of the bitter heritage of labour unrest which had descended to us might have been spared. He expressed the hope that, with the new insight which the war had brought us, a better understanding might prevail, and the welfare of the industrial population, upon which the prosperity of the Empire depended, be safeguarded to the utmost of our power.

A Royal Humane Society Certificate on vellum was presented to Dr. T. F. Ryan at Edmonton Military Hospital on March 10th for attempting the rescue of a lad who was drowned in a pond at Edmonton on Jan. 28th.

**BANFF INSURANCE COMMITTEE.**—At a meeting of the Banff Insurance Committee, held on March 10th, it was intimated that the Committee had decided not to allow the doctors to prescribe patent medicines, but only to allow prescriptions for medicines appearing in the P.B. and the B.P.C. lists. Doctors would be allowed to make "repeats" only on prescriptions which had been dispensed within the calendar month in which the prescription was dispensed.

**ROYAL DEVON AND EXETER HOSPITAL, EXETER.**—The annual meeting of the friends of this charity was recently held under the presidency of Sir E. Channing Wills. The medical report stated that the in-patients numbered 2185, an increase of 65 on the previous year, and a record for the hospital. The average daily number of occupied beds was 172. The financial statement was satisfactory and showed a total income of £15,207 compared with £12,360 in 1915.

**THE LATE DR. HENRY COLPOYS TWEEDY.**—Dr. Henry Colpoys Tweedy, who died last week at Clifton, Bristol, had passed his active professional life in Dublin. He graduated M.B. of Dublin in 1871, and was elected a Fellow of the Royal College of Physicians of Ireland in 1889. He was for many years visiting physician to Dr. Steevens' Hospital. Some 15 years ago his sight failed, and he was compelled to retire from practice, since when he has lived in the south of England.

**DONATIONS AND BEQUESTS.**—The late Dame Hester Mary Stewart has bequeathed by will £1000 each to the Zenana Bible and Medical Mission, the London Fever Hospital, Dr. Barnardo's Homes, the Royal Infirmary, Perth, and the Royal Infirmary, Edinburgh.—By will the late Mrs. Edith Harriet Scott left £1000 to St. George's Hospital. The residue of the estate, after providing legacies to other charities, is left in equal shares to Guy's Hospital, St. George's Hospital, and the Hospital for Diseases of the Heart, Soho-square.

The late Mr. Peter Reid has, among other bequests, left £20,000 to the Hospital for Sick Children, Great Ormond-street, for erecting and helping to maintain a convalescent home for the patients; and £500 each to the Hospital for Consumption and Diseases of the Chest, the London Hospital, the Metropolitan Convalescent Institution, St. Mary's Hospital, Paddington, St. Thomas's Hospital.—By will the late Captain Edward Vivian Dearman Bi-chall, D.S.O., has left £2000 to the chairman of the Buckinghamshire Territorial Association for the benefit of the wounded men of the 1st Bucks Battalion and for the widows and dependents of those killed in the war; and among other bequests £100 each to Gloucester Infirmary and Leeds Infirmary.—Miss Mary Grace Child has left by will £2000 to the London Hospital.—By will the late Mr. John Leigh has bequeathed £1000 to the Oldham Infirmary.

**ROYAL SUSSEX COUNTY HOSPITAL.**—The Royal Sussex County Hospital at Brighton has suffered financially from the war conditions and showed at the end of 1916 an adverse balance of over £2700. During the year 784 military cases were treated, a daily average of 60 beds being occupied by soldiers. The number of female in-patients exceeded by 73 those treated in 1913, which previously held the record of 1226 cases. The cost per bed rose last year to the unprecedented figure of £93 6s. 6d., while the financial support given by the public showed a considerable falling off. The deficiency in the year's working (£2703) has been met by a call upon the available fund, which is now practically exhausted. It had, by some at any rate, been anticipated, inasmuch as many suggestions had been thrown out for the establishment of pay-wards with a view of easing the burden of maintenance. But there are legal difficulties in the way, and at the annual court of governors the chairman of the board of management, in reviewing the financial position, pointed out that should the position necessitate the closing of the wards for a period they might possibly be opened as pay-wards. Lord Hythe, the new President, urged that the needs of the hospital should be brought home to the local branch of the League of Mercy with a view of securing aid from the King Edward's Hospital Fund.

## Parliamentary Intelligence.

### NOTES ON CURRENT TOPICS.

#### *Venereal Disease Bill.*

THE Venereal Disease Bill has been read a third time by the House of Lords. It is now under the consideration of the House of Commons.

#### *Criminal Law Amendment Bill.*

Further progress has been made in the Standing Committee of the House of Commons with the detailed consideration of the Criminal Law Amendment Bill. On Thursday, March 15th, the principal matter of discussion was the age of consent on the part of girls. An amendment was proposed to raise it from 16 to 17 years of age, and it received considerable support. Sir GEORGE CAVE, the Home Secretary, however, declined to accept the proposal, because on the experience of the past he feared that it would lead juries to acquit men who were charged with the offence on the ground that they had reasonable cause to believe that the girl was above the age. The amendment was rejected by 21 votes to 20. Clause 3 of the Bill, however, provides that reasonable cause to believe that the girl was of or above the age of 16 shall not in future be a defence to a charge under the principal Act.

On Tuesday, March 20th, the Committee was engaged in considering penal provisions in the Bill in regard to brothel-keepers and solicitation.

#### *Disabled Soldiers.*

The House of Commons on Monday, March 19th, rediscussed the provisions for disabled soldiers under the proposed Royal Warrant. Mr. BARNES, the Minister of Pensions, announced some minor changes in its terms.

### HOUSE OF COMMONS.

WEDNESDAY, MARCH 14TH.

#### *Prisoners of War in Turkey.*

Answering Mr. HUME-WILLIAMS, Mr. JAMES HOPE (representing the War Prisoners Department) said: The Turkish Government persist in their refusal to allow prisoners of war camps to be visited by representatives of the American Embassy. Seven of the camps were, however, visited in November by delegates of the International Red Cross Society—namely, those at Eski Shehir, Aifon Kara Hissar, Ismidt, Broussa, Konia, Kirshehir, and Yozgad, besides two hospitals at Constantinople and the Island of Prinkipo, where General Townshend is interned. The British prisoners at the camps visited numbered 182 European and 211 Indian officers and 658 European and 417 Indian non-commissioned officers and men. From the information obtained through the Red Cross delegates it appears that although the condition of the officers is on the whole not unsatisfactory, that of the rank and file leaves much to be desired and gives cause for much anxiety. There remained unvisited 14 camps and 3 hospitals containing, according to figures furnished by the Turkish authorities, 131 European officers and 1086 European and 8115 Indian non-commissioned officers and men. The information available respecting the camps unvisited is scanty and in general unsatisfactory, but has recently been somewhat more reassuring, at least as regards the transmission of the relief in money and kind which is continuously being issued by the United States Embassy, and for which H.M. Government are profoundly grateful.

#### *Medical Resources of India in the War.*

Mr. CHAMBERLAIN (Secretary for India) in the course of his remarks dealing with India's contribution to the war said: The House will not blame me if I spend a moment over the medical services. The medical arrangements of the Indian authorities, whether at home or abroad, have come under severe criticism, and this is not the occasion for me to offer any justification or any defence, but I want to tell the House in a few words what the Government of India did from the narrow resources, for after all they are very narrow resources, at their disposal. Forty field ambulances, 6 clearing hospitals, 35 stationary hospitals, 18 general hospitals, 9 X ray sections, 8 sanitary sections, 7 advanced depots, and 1 general medical store depot have been sent on service over-seas. The personnel provided for these units and other services amounts to 258 officers of the Royal Army Medical Corps, 704 officers of the Indian Medical Service, 40 lady nurses, 475 assistant surgeons, 854 sub-assistant surgeons, 720 British nursing orderlies, 2840 Indian ranks, and nearly 20,000 Indian followers. In order to meet the heavy demands on the Indian Medical Service nearly 350 officers have been withdrawn from civilian employment, and some 200 private practitioners and civil assistant surgeons have been given temporary commissions. In the subordinate

branches 205 assistant surgeons and 560 sub-assistant surgeons in various kinds of civil employment have been released for military duty. May I say at once, whilst abstaining from any plea in defence of either the Secretary of State for India or the Government of India, in connexion with the military arrangements, that, as far as I know, all the testimony from everyone who has had experience concurs in this, that the devotion and self-sacrifice of the officers of the Medical Services attached to the Expeditionary Forces have not been exceeded, and could not be exceeded, in this war. The House knows that this is not the last word of the Government of India on the subject.

THURSDAY, MARCH 15TH.

#### *State Registration of Nurses.*

Major CHAPPLE asked the Parliamentary Secretary to the Local Government Board whether, in view of the fact that all the great associations representing the nursing profession in the United Kingdom, including the British Medical Association, the Royal British Nurses' Association, the Matrons' Council of Great Britain and Ireland, the Society for the State Registration of Trained Nurses, the Fever Nurses' Association, the Association for Promoting the Registration of Nurses in Scotland, the Scottish Nurses' Association, the Irish Nurses' Association, the National Union of Trained Nurses, and the College of Nursing, Limited, have now announced officially their unqualified support of State registration, he would bring in a Bill to effect this purpose.—Mr. HAYES FISHER answered: I am aware that the bodies named have expressed opinions in favour of the State registration of nurses, but the information before me does not show that they are in agreement as to the character of the scheme. I cannot at present give any promise of legislation on the subject.

#### *A Case of Agoraphobia.*

Sir J. D. REES asked the Under Secretary for War whether agoraphobia was included among the diseases which disqualify persons otherwise qualified to serve in the Army; and, if so, how many agoraphobists had been granted exemption by medical boards since the war began.—Mr. MACPHERSON replied: In only one case, as far as is known, has this disease disqualified a man for service, and the man in question was otherwise of unsound mind, though not certifiable.

#### *Medical Examination of Recruits.*

Mr. GLANVILLE asked the Under Secretary for War whether he would consider the possibility of giving such a thorough medical examination to recruits as would prevent men passed for active service and similar categories taking up the time and attention of the military authorities for months until their shortcomings caused them to be relegated to C 3 category to which they should have been originally passed.—Mr. MACPHERSON wrote in reply: The whole question receives the constant and careful consideration of the War Office. The number of men, however, where the original classification has been revised is an infinitesimal proportion of the total, and considerably more men are raised in the category every month than lowered. My honourable friend appears to make a reflection upon the capacity of those members of the medical profession who are doing their work under great pressure, and I cannot let it pass without a strong protest. Considering the vast total of medical classifications carried out every day, the total number of mistakes made is surprisingly small.

TUESDAY, MARCH 20TH.

#### *Medical Men in Ireland and Military Service.*

Colonel MCCALMONT asked the Under Secretary for War whether it was in accordance with the decision of the Army Council that a civilian doctor in Ireland appointed in medical charge of troops in his locality before the war, who although of military age had been found medically unfit for general service by a board, was to be forthwith replaced by another local civilian doctor of over military age; if so, upon what grounds had it been decided to penalise young unfit doctors; and whether this decision would apply to doctors who had become unfit through military service.—Mr. MACPHERSON replied: It is in accordance with the wishes of the Central Medical War Committee that we should not employ young doctors at home, as this prevents others from volunteering. Young medical men who are unfit are employed on general service at home and not locally.

THE Raymond Horton Smith prize, awarded by the University of Cambridge to that candidate for the degree of M.D. who presents the best thesis for the degree during the academical year, provided that he has taken honours in a tripos examination, has been won by Mr. F. Roberts, B.C., M.D., designate of Clare. The subject of the thesis was "Degeneration of Muscle following Nerve Injury."

## Appointments.

*Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

- BARTROW, Dr. IRENE, has been appointed Assistant Medical Officer of Health (*pro tem.*) for Sheffield.  
 COOPER, H. G., M.B., B.C. Cantab., Certifying Surgeon under the Factory and Workshop Acts for the Altringham district of the county of Chester.  
 DICKSON, Dr. MARGARET SCOTT, Medical Officer of Dundee's New Maternity and Child Welfare Scheme.  
 HILLIARD, H., M.R.C.S., L.R.C.P., D.P.H., Anæsthetist to Charing Cross Hospital.

## Vacancies.

*For further information regarding each vacancy reference should be made to the advertisement (see Index). When the application of a Belgian medical man would be considered the advertiser is requested to communicate with the Editor.*

- BIRMINGHAM CITY EDUCATION COMMITTEE.—Temporary Assistant School Medical Officer. Salary £300 per annum.  
 BIRMINGHAM GENERAL DISPENSARY.—Resident Medical Officer, unmarried. Salary £250 per annum, with apartments, &c.  
 BIRMINGHAM AND MIDLAND EYE HOSPITAL.—Female House Surgeon. Salary £200 per annum.  
 BLACKPOOL, VICTORIA HOSPITAL.—House Surgeon. Salary £250 per annum, with board, &c.  
 BRISTOL ROYAL HOSPITAL FOR SICK CHILDREN AND WOMEN.—Female House Surgeon. Salary £150 per annum, with board, &c.  
 BRISTOL ROYAL INFIRMARY.—House Physician and House Surgeon. Salary at rate of £210 per annum, with board, &c.  
 BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.  
 DEVONPORT, ROYAL ALBERT HOSPITAL.—Assistant House Surgeon, unmarried. Salary £150 per annum, with board, &c.  
 EAST RIDING LUNATIC ASYLUM, Beverley.—Temporary Female Assistant Medical Officer. Salary at rate of £250 per annum, with board, &c.  
 EVELINA HOSPITAL FOR SICK CHILDREN, Southwark, S.E.—Clinical Assistants in Out-patient Departments.  
 GLAMORGAN COUNTY ASYLUM, Bridgend.—Temporary Assistant Medical Officer. Salary 26s. per week, with board, &c.  
 GRIMSBY COUNTY BOROUGH.—Temporary Female Assistant Medical Officer. Salary £350 per annum.  
 GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon. Salary £250 per annum, with board, &c.  
 IPSWICH, EAST SUFFOLK AND IPSWICH HOSPITAL.—Female Resident Officer.

- KENSINGTON AND FULHAM GENERAL HOSPITAL, Earl's Court, S.W.—Resident Medical Officer. Salary £150 per annum.

- LEEDS PUBLIC DISPENSARY.—Second Female Resident Medical Officer. Salary £200 per annum, with board, &c.

- LIVERPOOL, DAVID LEWIS NORTHERN HOSPITAL.—House Surgeon for six months. Salary at the rate of £150 per annum, with board, &c.

- LIVERPOOL, ROYAL SOUTHERN HOSPITAL.—Two House Surgeons for six months.

- MANCHESTER, BAGULEY SANATORIUM FOR TUBERCULOSIS.—First Assistant Medical Officer, unmarried. Salary £300 per annum, with board, &c.

- MANCHESTER CORPORATION.—Assistant Tuberculosis Officer. Salary £250 per annum.

- MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Park-place, Cheetham Hill-road.—House Surgeon. Salary £150 per annum, with board, &c.

- METROPOLITAN HOSPITAL, Kingsland-road, E.—Temporary Medical Officer for the Tuberculosis Dispensary.

- QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford.—House Surgeon.

- QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E.—House Physician and Casualty House Surgeon for six months. Salary £120 per annum, with board, &c. Also Temporary Anæsthetist.

- ROTHERHAM HOSPITAL.—Junior House Surgeon. Salary £150 per annum, with board, &c.

- ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.—Two House Physicians and Two House Surgeons. Salary £50 per annum, with board, &c. Also Junior Obstetric Assistant. Salary £62 per annum, with board, &c.; also care of 16 beds at Endsleigh Maternity Hospital. Salary given. Also Assistant Anæsthetist. Salary £93 per annum, with board, &c. Also to attend at Endsleigh-street Maternity Hospital. Salary £60 per annum.

- ROYAL WATERLOO HOSPITAL FOR CHILDREN AND WOMEN, S.E.—Temporary Honorary Assistant Physician.

- SHEFFIELD ROYAL INFIRMARY.—House Physician. Salary £120 per annum, with board, &c.

- SOUTHAMPTON, ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL.—House Physician and Junior House Surgeon. Salaries £150 and £120 per annum respectively, with board, &c.

- ST. BARTHROLOMEW'S HOSPITAL.—Assistant Ophthalmic Surgeon.

- ST. PETER'S HOSPITAL, Henrietta-street, Covent Garden, W.C.—Junior Anæsthetist.

- TRURO, ROYAL CORNWALL INFIRMARY.—House Surgeon. Salary £150 per annum, with board, &c.

- THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Atherton (Warwick) and Minehead (Somerset).

## Births, Marriages, and Deaths.

### BIRTHS.

BOOTH.—On March 19th, at "Wyngarth," Breck Hill-road, Mapperley Plains, Notts, the wife of Captain N. Booth, M.B., B.S. Lond., R.A.M.C., of a daughter.

BUSHE.—On March 17th, at Tollesbury Knights Rectory, Witham, Essex, the wife of Staff Surgeon Charles Kendal Bushe, M.D., R.N., of a daughter, who survived her birth only a few hours.

GROGOON.—On March 20th, at 129, Camberwell-road, S.E., to the wife (*née* Florence Muriel Steele) of Jonathan Grogouo, M.R.C.S., L.R.C.P.—a daughter.

TAYLOR.—On March 12th, at the Vicarage, Walton-le-Dale, Lancs., the wife of Leonard H. Taylor, Lieutenant, R.A.M.C., of a son.

### MARRIAGES.

BAZETT—LIVESEY.—On March 10th, at St. Andrew's Church, Oxford, Henry Cuthbert Bazett, Captain, R.A.M.C., to Dorothy Livesey, daughter of the late T. J. Livesey and Mrs. Livesey, of Pueblo, Colorado.

CALTHROP—CHANCE.—On March 14th, at St. Barnabas' Church, Kensington, Edward Spencer Calthrop, R.N., M.B., B.S., to Eleanor Mary, only daughter of Mr. F. W. Chance, of Morton, Carlisle.

FRY—BECKER.—On March 14th, at St. Paul's Church, Tottenham, Captain Augustin P. Fry, R.A.M.C., to Elsie Blanche, eldest daughter of Mr. G. Becker and Mrs. Becker, Tottenham, N.

SMITH—USHER.—On March 12th, at Holy Cross Church, Lichfield, Vincent Smith, Lieutenant, R.A.M.C., to Hope, daughter of the late Major Usher, 7th Dragoon Guards, and Mrs. Usher, Rathdown Cottage, Greystones, Co. Wicklow.

### DEATHS.

BLOMFIELD.—On March 18th, at The Grove, Robertsbridge, Sussex, Dr. Samuel Bartlett Blomfield, aged 47.

GIBBINS.—On March 17th, at Holmdale, Parkstone, Kenneth Mayoh Gibbins, M.B. Lond.

HAMMOND.—On March 15th, died of wounds, John Maximilian Hammond, M.B., B.S., Lieut., R.A.M.C., aged 41.

HEARD.—On March 15th, at Bradford, the result of a stroke while serving as Lieut., R.A.M.C., Francis George Heard, L.R.C.P., L.R.C.S. Edin., aged 53.

MILLER.—On March 11th, killed in action, Archibald Ingram Miller, M.B., Ch.B. Edin., Lieut., R.A.M.C., aged 34.

N.B.—A fee of 6s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

## BOOKS, ETC., RECEIVED.

### ALLEN, GEORGE, AND UNWIN, London.

The American League to Enforce Peace. By C. R. Ashbee. With an Introduction by G. Lowes Dickinson. 2s. 6d. net. Professionalism and Originality. With Some Suggestions for National Reconstruction. By F. H. Hayward, D.Litt., B.Sc., Inspector of Schools. 6s. net.

### CAMBRIDGE UNIVERSITY PRESS.

Science and the Nation. Essays by Cambridge Graduates, with an Introduction by the Right Hon. Lord Moulton, K.C.B., F.R.S. Edited by A. C. Seward, F.R.S., Master of Downing College, Cambridge. 6s. net.

Psychology of Sound. By H. J. Watt, M.A., Ph.D., D.Phil. 10s. 6d. net.

Domestic Economy for Teachers and Students. Part 1, Theory, by Marion G. Greenwood. Part 2, Practice and Teaching, by Florence Baddeley. Each 2s. 6d. net.

### CHAPMAN AND HALL, London.

Bird of Life. By Gertrude B. M. Vaughan. 5s. net.

### CHURCHILL, J. AND A., London.

St. Thomas's Hospital Reports. New Series. Edited by Dr. J. J. Perkins and Mr. C. A. Ballance. Vol. XLIII. 8s. 6d. net.

### CONSTABLE AND CO., London.

Letters from a French Hospital. 2s. net.

### FOSTER GROOM, 15, Charing Cross-road.

How to Take Care of Your Teeth. With a chapter on the Feet by H. E. Sykes Brown, M.I.H. Foreword by J. Sim Wallace, D.Sc., M.D., L.D.S. 1s. net.

### HEINEMANN, WILLIAM, London.

Treatment of Tabetic Ataxia by Means of Systematic Exercise. By Dr. H. S. Frenkel. Second English edition, by L. Freyberger, J.P., M.D. Vieira, Barrister-at-Law. 12s. 6d. net.

### IMPRIMERIE NATIONALE, Paris.

Commentaires de la Faculté de Médecine de l'Université de Paris (1395-1516). Publié avec un introduction et des notes par le Dr. Ernest Wickersheimer, bibliothécaire de l'Académie de Médecine.

### LIVINGSTONE, E. AND S., Edinburgh.

Catechism Series, 1s. 3d. each. Surgery. Parts 1 and 2, third edition. Materia Medica, Parts 1 and 2, second edition. Physiology, Part 1, third edition. Pathology, Part 1, second edition.

### MACMILLAN AND CO., London.

Organic to Human, Psychological and Sociological. By Henry Maudsley, M.D. 12s. net.

## Notes, Short Comments, and Answers to Correspondents.

### CURIOSITIES OF WAR

THERE is no doubt that at the conclusion of the present war there will be many who have taken part in various ways who could furnish instances of the curiosities of war, which, if collected together, would make a large volume. In the year 1860, Thomas Carter, of the Adjutant-General's office, published a book of just over 400 pages, which was dedicated, with permission, to H.R.H. the Duke of Cambridge, and entitled, "Curiosities of War and Military Studies, Anecdotal, Descriptive, and Statistical." Some of the contents were new and some old. Of the old, we give the following example, which is of interest to the medical profession:—

*Singular Description of a Deserter from the Twenty-Second Regiment of Foot.*—(From the *London Gazette*, of July, 1689.)—It is away out of Captain Soane's company, in his Grace the Duke of Norfolk's regiment of infantry, quartered at Newport, in Shropshire, Roger Curtis, a barber-surg-on, a little man, with short black hair, a lit le curled; round visage, fresh-coloured, in a light-coloured cloth coat, with gold and silver buttons, and the loops stitched with gold and silver, red plush breeches, and white hat; he liv'd formerly at Downham Market, in Norfolk. Whoever will give notice to Francis Baker, the agent to this said regiment, in Hutton Garden, so that he may be secured, shall have two guineas reward.

The following paragraph in the book is also interesting, though its information is probably familiar to many of our readers:—

*Supposed origin of sashes.*—Sashes are believed to have been invented for the ease of wounded officers, by means of which (in case any of them were so badly wounded as to render them incapable of remaining at their posts) they might be carried off with the assistance of two men. They are now reduced to a very small size, and, of course, unfit for the original purpose.

Woman in Battle is the title of one section of the book. Here is related the life and adventures of Mrs. Christian Davies, the British Amazon, commonly called Mother Ross, who served as a foot soldier and dragoon in several campaigns under King William and the great Duke of Marlborough, and was eventually made a pensioner of Chelsea College by Queen Anne, dying on July 7th, 1739. The story is told also of Phoebe Hessel, born in Stepney in 1713, who served for many years as a private soldier in the 5th Regiment of Foot in different parts of Europe, and in the year 1745 fought under the command of the Duke of Cumberland at the battle of Fontenoy, where she received a bayonet wound in her arm. King George IV. allowed this aged veteran a pension of half a guinea a week, which she enjoyed for many years, dying at Brighton, where she long resided, on Dec. 12th, 1821, aged 108. There is a section of military epitaphs, and in it we find one to the memory of Thomas Thatcher, in the 2nd Regiment of the Hants Militia, who "died of a violent fever, contracted by drinking cold small Beer when Hot":—

Here sleeps in peace a British Grenadier,  
Who caught his death by drinking cold small Beer.  
Soldiers be wise from his untimely fall,  
And when you're hot drink strong or none at all.

### MAURITIUS MEDICAL REPORT.

It appears from the medical section of the Mauritius Blue-book for 1915 that the total population of the island on Dec. 31st of that year, exclusive of the dependencies (7320), was estimated at 375,420, showing a decrease of 813 on the population returns for 1914.

There were 11,893 births registered during the year. The law allows a delay of 45 days for free registration, and the number of births which were not registered owing to death intervening before registration was 1201. The total number of births was accordingly 13,094, of which 6747 were males and 6347 females, giving a proportion of 34·8 infants born to 1000 persons living. The deaths registered numbered 13,101, giving a proportion of 34·8 deaths to 1000 persons living.

The general health conditions during 1915 were not satisfactory. The number of patients treated at public hospitals showed an increase over that recorded in 1914. There was a considerable reduction in the number of patients attending dispensaries, but more out-door patients were treated in hospitals. The diseases that caused the largest number of deaths were malaria (4401), tuberculosis (959), pneumonia (710), and dysentery (636), but it should be observed that a medical certificate is not required in all cases. Only 33 cases of plague were registered during the year, as against 125 in 1914; it was the lowest total hitherto recorded in any year. There was a marked reduction in the number of admissions for enteric fever from 234 in 1914 to 188 in 1915. Malaria still causes more deaths than

any other disease. The number of deaths ascribed to fever was 4401, showing an increase of 487 on that recorded in 1914. The case mortality was 1·63 percent., as against 1·77 percent. in 1914. Malaria was most prevalent in March, April, and May, after the comparatively heavy rainfalls in February and March. The spleen census and the treatment of schoolchildren with quinine, as well as the free house-to-house distribution of quinine, have been continued. The number of children vaccinated during the year was 10,358.

The mean rainfall from 42 stations was 53·20 inches, as compared with an average of 75·84 inches. The highest temperature was 91·5° on Jan. 28th and the lowest 54·0° on August 22nd.

### ST. GEORGE AND THE DRAGON.

ON the new pound notes the figure of St. George and the dragon is worth studying and comparing with some of the early designs on our sovereigns and crown-pieces. The original design of this character was made by Benedetto Pistrucci (1784-1855), a gem engraver and medallist, and there is a legend that Pistrucci's original model was an Italian waiter who used to serve in a restaurant near Leicester-square, London, and that Pistrucci chose him for his fine figure. In 1817 a pattern crown-piece was made by Pistrucci with his design on the reverse but without the artist's name or initials, but on some afterwards he had his name in full, and then later B.P., which can still be seen on our sovereigns and crown-pieces, under the design. Pistrucci's figure portrayed a very muscular body, bent into a curve, the rider's face almost touching the crest of the horse's neck, with the muscular right arm only slightly bent and grasping a short dagger, for the spear is broken, and a part of the shaft is lying at the hind feet of the horse. Only the left hand holding the reins shows. The right leg is slightly bent, and the foot pushed forward. The figure on the pound note portrays an upright unmuscular body of inverted triangle shape, the right arm holding a spear is bent, and raised so high that the elbow makes an acute angle; and the whole of the left upper arm and hand holding the reins shows. The right leg is bent back, and the limb forms an acute angle. The horse's tail is drawn in instead of out, and the disposition of the forelegs is puzzling.

### DECENTRALISED PATRIOTIC EFFORT.

Mr. W. R. Boelter, late editor of the *Smallholder*, is the author of a penny pamphlet on "Parish War Societies: How to Form and Conduct Them" (published by the Smallholders' Union, Ltd., 7, Queen-street-place, London, E.C.), based upon an experiment in village organisation made by him in Wendy, Cambs. Mr. Boelter defines a parish war society as consisting of those members of a parish who know that the war is not to be won by fighting alone, but also by working, saving, and planning, and who have therefore banded themselves together in order to do these things more effectively than they could do them alone. In a parish war society Mr. Boelter finds the sort of flexible organisation which can be grafted upon any kind of war work already in being. The pamphlet describes the way of starting such a parish war society and the directions in which it has developed at Wendy. A welfare subcommittee has been one of these, charged with the duties of organising Red Cross work, of making comforts for the men in the fighting line and prisoners of war, and of arranging for the care of convalescent soldiers and other ex-Service men. This useful and stimulating pamphlet ends by suggesting rules for the running of such a society.

### THE RIGHT AND LEFT HANDS.

THE care of the limbs is now a subject of increased importance, and the comparisons between the right and left hand and right and left leg are of interest to many fighters, workers, injured persons, their relatives, the insurance companies, and the State generally. Ambidexterity is a matter to which more attention will probably be paid in the near future. Students of the subject maintain that as many stone "scrapers," "hammers," "pounders," and so forth, which were used without heads or handles, were made for use by the left hand as for the right, although the right hand came gradually to be preferred for offence and the left for defence, the right hand being termed the "throwing," "great," or "male" hand and the left hand the "female" hand. It is alleged that in Africa there are more ambidextrous men than in Europe. In the Arabian Nights' Entertainments, the Christian merchant who excused himself to his host for feeding with his left hand, explained that for the theft of a purse after spending all his money on a lady the judge had ordered his hand to be cut off and would have cut his foot off, too, but for the intercession of the owner of the purse. Lane's note is: "This law imposing the loss of the hand for a theft of

anything exceeding a quarter of a dinar in value, induced a Mussulman to inquire, "If the hand is worth 500 dinars (this being the fine for depriving a man of that member) why should it be cut off for a quarter of a dinar?" He was answered, "An honest hand is of great value, but not so is the hand that hath stolen." A dinar (Latin, denarius) was the name of a gold coin issued by the Caliphs of Damascus of about 65 grains troy.

Although the right hand does heavier and finer work than the left it is at the same time probably more alert in taking care of itself; but the right hand is not spared as much as it might be, and often the left hand might be given more work to do in lifting and carrying, thus saving the right hand from the after-effects of muscular strain which is frequently shown in a tremor of the muscles which may last for several hours, and even over the next day, making the complete control of the muscles of the right arm and hand impossible. This is more especially observed perhaps in those sedentary workers who take to hard and unaccustomed manual labour, such as digging and wheeling barrows and chopping wood. The muscles of the arm seem to have a much longer "memory" of any unwanted strain imposed upon them, even when the owner of the limb has forgotten the job which his arm has performed. This is evident when he tries next to handle a pen, for example, or to do some delicate and fine work with the hand.

#### THE HEREDITARY FACTOR IN PELLAGRA.

An elaborate study, by Charles B. Davenport, of the Carnegie Station for Experimental Evolution, and Dr. Elizabeth B. Muncey, of the Eugenics Record Office (Bulletin No. 16), leads to the conclusion that the data collected show no evidence of direct heredity. There may, however, be an hereditary predisposition to the disease in those families in which chronic gastro-intestinal symptoms have existed for several generations. The relatively high proportion of gastric and intestinal diseases among pellagrinous families seems to substantiate this hypothesis. Of the 105 families in which there is only one case of pellagra, only three gave a history of intestinal or skin diseases in the ancestors, and only one a history of antecedent insanity. The authors conclude that with this predisposition to the disease, direct contact or life in endemic areas might afford the exciting factor necessary for its development.

#### CEDAR OIL AS AN ADDITION TO AMBRINE.

To the Editor of THE LANCET.

SIR.—May I suggest as an addition to paraffin wax for an "ambrine" preparation the use of cedar oil? Though nominally a "volatile oil," it resinsifies rapidly in contact with the air, as every histologist knows, and of course possesses the antisepic properties of all its class. It would give toughness to the paraffin. I do not know what its present price may be; but as the product of the distillation of a waste product—chip shavings and sawdust of pencil cedar—(*Juniperus americana* and *J. bermudiana*)—it has always been among the cheapest of essential oils.

I am, Sir, yours faithfully,

MARCUS HARTOG, M.A., D.Sc., &c.  
University College, Cork, March 13th, 1917.

#### HERB-COLLECTING.

THE Gardening Association, which is under the patronage of Princess Louise, Duchess of Argyll, has issued a second edition of a useful booklet, "Herb-Collecting for Boys and Girls," by Mrs. T. Chamberlain and Miss E. C. Wheelwright. In it are given instructions as to the finding of plants, the seasons in which to gather them, and the preparation for sale, together with many other hints which will prevent the labour of children in collecting wild herbs for medicinal use proving useless, as it may do unless properly guided. Experience has shown that there is little or no call for many of the herbs recommended in the first edition of "Herb-Collecting," and in the new edition omissions have been made, while special attention is called to those plants for which there is a brisk demand. The booklets can be obtained from the National Herb Growing Association, Queen Anne's Chambers, S.W.1, or from the Gardening Association, Lower Sloane-street, S.W.1, price 3*d.* each, or 2*s.* 9*d.* per dozen, post-free.

COMMUNICATIONS not noticed in our present issue will receive attention in our next.

The following journals, magazines, &c. have been received:—Journal of the Royal Sanitary Institute, Public Health, Shield, Canadian Journal of Medicine and Surgery, Proceedings of the Royal Society of Medicine, Bulletins et Mémoires de la Société Médical des Hôpitaux, British Dental Journal, Clinique Ophtalmologique, Journal of Hygiene, Archives Médicales Belges, Review Neurology and Psychiatry, Maternity and Child Welfare, Canadian Medical Association Journal.

## Medical Diary for the ensuing Week.

### SOCIETIES.

#### ROYAL SOCIETY OF MEDICINE, 1, WIMPOLe-STREET, W.

##### MEETINGS OF SECTIONS.

Monday, March 23rd.

ODONTOLOGY (Hon. Secretaries—F. R. Smyth, F. N. Doubleday, J. Howard Mumfrey): at 6 P.M. (*Cases 5 P.M.*)

*Exhibition and Report* (followed by a Discussion):

On Clinical Cases of Gunshot Injuries of the Jaws.

Cases will be shown by Mr. G. Paton Pollitt, Mr. B. Maxwell Stephen and Mr. F. N. Doubleday from 5 to 6 P.M.

Tuesday, March 27th.

MEDICINE (Hon. Secretaries—Charles R. Box, W. Cecil Bosanquet): at 5.30 P.M. *Lunaria Demonstration:*

Dr. C. R. Box and Mr. Walter Edmunds: Autochromes illustrating the Rash of Specific Fevers.

HUNTERIAN SOCIETY, at the Skin Department of St. Bartholomew's Hospital.

Wednesday.—4 P.M., Dr. H. G. Adamson: Demonstration on Interesting Cases.

### LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

#### ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East.

TUESDAY AND THURSDAY.—5 P.M., Goulstonian Lectures:—Dr. C. H. Miller: Paratyphoid Infections. (*Lectures II. and III.*)

#### POST-GRADUATE COLLEGE, West London Hospital, Hammermith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simon: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Partoe: Operations.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simon: Gynaecological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Partoe: Operations.

#### THE THROAT HOSPITAL, Golden-square, W.

MONDAY.—5.15 P.M., Special Demonstration of Selected Cases.

THURSDAY.—5.15 P.M., Clinical Lecture.

#### CHADWICK PUBLIC LECTURES.

THURSDAY (at the Royal Society of Medicine, 1, Wimpole-street, W.).—5.15 P.M., The Hygiene of the Soldier's Heart.

#### ROYAL INSTITUTE OF PUBLIC HEALTH, Lecture Hall of the Institute, 37, Russell-square, W.C.

Course of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—

WEDNESDAY.—P.M., Lecture XI.:—Lieut.-Col. Sir A. Pearce Gould, K.C.V.O.: Personal Habits in Relation to Public Health in Time of War. Prof. G. Sims Woodhead, Dr. G. B. Hunter, and Miss L. Barker have promised to take part in the discussion.

### EDITORIAL NOTICES.

It is most important that communications relating to the Editorial business of THE LANCET should be addressed exclusively "To the EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET should be addressed "To the Manager."

We cannot undertake to return MSS. not used.

Offices: 423, STRAND, LONDON, W.C. 2.

## MANAGER'S NOTICES.

## ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the new year, the price was raised to 8d. The rates of subscription remain as revised in October.

## TO SUBSCRIBERS.

**WILL** Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C. 2, are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and not to THE LANCET Offices.

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THE COLONIAL AND FOREIGN EDITION is published in time to catch the weekly Friday mails to all parts of the world.

## TO COLONIAL AND FOREIGN SUBSCRIBERS.

Subscribers abroad are particularly requested to note the rates of subscriptions given on page 7.

The Manager will be pleased to forward copies direct from the Offices to places abroad at the rates shown, whatever be the weight of any of the copies so supplied.

## METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, March 21st, 1917.

Date.	Rain-fall.	Solar Radio in Vacuo.	Maxi- mum Temp. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Remarks.
Mar. 15	...	63	45	35	35	36	Fine
.. 16	...	72	50	36	39	43	Cloudy
.. 17	...	90	58	39	40	42	Fine
.. 18	...	77	58	41	45	47	Cloudy
.. 19	...	71	51	41	42	44	Overscast
.. 20	0.05	77	46	38	37	40	Cloudy
.. 21	0.05	70	42	35	34	36	Cloudy

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

## Communications, Letters, &amp;c., have been received from—

- A.—Capt. M. B. Arnold, R.A.M.C.; Lady Angela Adair, Dunadry; Mr. F. W. F. Arnaud, Maidstone; Admiralty, Medical Department, Director-General of; Messrs. R. Anderson and Co., Edinburgh; Aberdeen Medico-Chirurgical Society, Librarian of; Mr. J. E. Adams, Lond.
- B.—Dr. O. C. Bradley, Edinburgh; Mr. P. J. Byrne, Clonmel; Messrs. Butterworth and Co., Lond.; Fleet Surg. Bassett-Smith, C.B.; British Red Cross Society, Lond., County Sec. of; Messrs. F. P. Baker and Co., Lond.; British Medical Association, (Malta Branch, Valletta), Hon. Sec. of; Bishopstone House, Bedford, Lady Supt. of; Messrs. W. H. Bailey and Son, Lond.; Messrs. Bale, Sons, and Daniellson, Lond.; Dr. A. E. Boycott, Lond.; Messrs. D. Brown and Son, Huddersfield; Capt. N. Booth, R.A.M.C.; Bristol Royal Hospital for Sick Children, Sec. of; Blackpool Gazette News, Ltd.; Dr. W. Bennett, Slaidburn, Brentford Guardians, Clerk to the.
- C.—Capt. J. Campbell, R.A.M.C.; Mr. W. H. Croly, Lond.; Messrs. J. and A. Churchill, Lond.; Capt. F. D. Carns, R.A.M.C.; Charing Cross Hospital, Lond., Sec. of; Mr. P. P. Cole, Lond.; Cancer Hospital (Free), Lond., Sec. of.
- D.—Dr. L. Drage, Hatfield; Messrs. W. Dawson and Sons, Lond.; Prof. H. R. Dean, Manchester; Staff-Surg. S. F. Dudley, R.N.; Messrs. C. W. Davies and Son, Lond.; Dharamgadhra State, Chief Medical Officer of; Dr. M. B.

- L.—Dr. S. O. Lawrence, Lond.; Dr. R. B. Low, Lond.; Messrs. Lee and Nightingale, Liverpool; Local Government Board, Lond.; Sec. of; Dr. F. Langmead, Lond.; Leeds Public Dispensary, Sec. of; Mr. C. E. Little, Birmingham; Messrs. Lyon, Lond.; Dr. M. Leslie, Paris; Dr. H. M. Little, Lond.; Dr. R. J. Lee, West Drayton; *Laboratory Journal*, Lond., Editor of.

- M.—Messrs. May and Baker, Lond.; Messrs. Mather and Crowther, Lond.; Dr. J. M. Murray, Edmonton, Canada; Dr. A. F. Miller, Kentville, N.S.; Mr. G. Mayall, Bolton; Mr. J. E. May, Lond.; Dr. H. C. Major, St. Brendale; Manchester Northern Hospital for Women, &c., Sec. of; Messrs. McDowell, Steven, and Co., Falkirk; Maltine Manufacturing Co., Lond.; Manitoba Medical College, Winnipeg, Librarian of Dr. Gladys Montgomery, Glasgow; McGill University Medical Library, Montreal, Asst. Librarian of; Miss M. Milne, Aberdeen; Mr. J. Y. W. MacAllister, Lond.; Miss E. Montizambert, Paris; Medical Research Committee, Lond., Sec. of; Mr. J. M. Gratt, Dublin; Dr. J. J. Moran, Louisville, U.S.A.; *Midland Counties Herald*, Birmingham.

- N.—Mrs. G. Nesfield, Congleton; Nurses' Co-operation, Lond.; National Food Reform Association, Lond.; Mr. J. Neal, Lond.

- O.—Organizers' Clearing House, Lond.; "Observer."

- P.—Mr. E. S. Pierrepont, Lond.; Mr. G. R. Peterson, Saskatoon; Mr. F. C. Pybus, Newcastle-on-Tyne; Dr. G. N. Pitt, Lond.; Dr. B. E. Prest, New Cumnock; Capt. J. Parkinson, R.A.M.C.; Dr. A. B. Pies, Siteobondo, Java; Capt. H. Platt, R.A.M.C.(T.); Major W. Pearson, R.A.M.C.; Prudential Assurance Co., Lond.; Dr. G. H. Pearce, Batley.

- Q.—Queen's Auxiliary Hospital, Lond., Hon. Sec. of.

Letters, each with enclosure, are also acknowledged from—

- A.—Lieut. G. Arthur, R.A.M.C.; Dr. J. H. Ashworth, Margate; Ashwood House, Kingawinford; Dr. T. G. Atkins, Cork; A. R. M.

- B.—Mr. G. W. Baker, Leicester; Mr. P. L. Booth, Walney Island; Messrs. Burroughs Wellcome and Co., Lond.; Miss M. Battie, Farington; Dr. N. W. Bourne, Lond.; Mr. W. Bryce, Edinburgh; Surg. R. J. Bell, R.N.; Miss Bubb, Heathfield; Dr. Bartum, Handsworth; Mr. H. H. Brown, Lond.; Capt. A. Barr, A.V.C.; Birkenhead Union, Clerk to the; Sir J. C. Rose, K.C.I.E.; Mr. J. Butterworth, Middle on Burnley Guardians, Clerk to the; Mr. J. Barnes, Birmingham; Messrs. Burgoyne, Burbidges and Co., Lond.; B. D. E.

- C.—Mr. A. W. S. Curtiss, Burwash; Cardiff Corporation, Clerk to the; Messrs. Cutting and Underwood, Lond.; Mr. A. C. Cooke, Lond.; C. H.

- E.—Lieut. J. I. Enright, R.A.M.C.; Capt. J. Ewing, R.A.M.C.

- F.—Dr. H. W. Furnival, Singapore; F. O.; Mr. G. B. Pitt, Lond.

- G.—Dr. S. Gill, Formby; Messrs. Grantham and Co., Reading.

- H.—Mr. W. F. Harvey, Leeds; Mr. J. T. Hyatt, Shepton Mallet; Haydock Lodge, Newton-le-Woods, Sec. of; H. S. B. J.; Messrs. W. and R. Holmes, Glasgow; Capt. R. L. Hutton, R.A.M.C.; Messrs. J. Heywood, Manchester; Hants County Asylum, Fareham, Clerk to the; Mrs. Hogarth, Morecambe.

- I.—I. M. B.

- J.—Dr. R. B. Jackson, Culkey; Mr. W. E. Jones, Blackburn; Dr. R. Jardine, Glasgow.

- K.—Kolynos, Ltd., Lond.; Mr. T. Kent, Kirkwall.

- L.—Leith Hospital, Matron of; London Throat Hospital, Sec. of; London Press Exchange, Sec. of;

- M.—Royal Academy of Medicine in Ireland, Dublin; Royal Institution of Great Britain, Lond.; Royal Society of Arts, Lond.; Royal Faculty of Physicians and Surgeons, Glasgow, Acting Sec. of; Mr. C. B. Richards, Peebles; Dr. R. R. Rentoul, Liverpool; Capt. J. K. Rennie, R.A.M.C.; Royal Albert Edward Infirmary, Wigan, Sec. of; Royal Microscopical Society, Lond.; Messrs. Robertson and Scott, Edinburgh; Mr. R. P. Rowlands, Lond.; Lieut.-Col. B. D. Rudolf.

- S.—Dr. G. A. Sutherland, Lond.; Sheffield Royal Infirmary, Sec. of; Dr. T. Stanton, Knutsford; Sunderland Royal Infirmary, Sec. of; Capt. H. Stott, I.M.S.; Messrs. Simpkin, Marshall, and Co., Lond.; Monsieur M. Sezier, Lyons; Measles Sterns, Lond.; Smith's Advertising Agency, Lond.; Mr. W. Soames, Lond.; Mr. H. T. Sells, Lond.; Messrs. Saward, Baker, and Co., Lond.; Messrs. W. H. Smith and Son, Southampton; Mr. W. Stuart-Low, Lond.; Miss M. Sheepbanks, Lond.; Messrs. Stubbs, Dublin; Messrs. James Smith, Lond.; Sir Edward A. Schäfer, Edinburgh; Messrs. J. Spicer and Sons, Birmingham.

- T.—Messrs. W. Thacker and Co., Lond.; Tellier Camera Co., Lond.; Capt. C. A. Temple, C.A.M.C.

- V.—Victoria Hospital, Burnley, Sec. of; Vitamogen, Lond.

- W.—Dr. C. Watson, Edinburgh; Mr. W. I. de C. Wheeler, Dublin; West London Hospital Post-Graduate College, Dean of; Dr. W. J. Wilson, Belfast; Messrs. Alex Wood, Campbell, and Co., Lond.; Mr. F. F. White, Helston; Prof. S. White, Sheffield; Capt. P. J. Watkins, R.A.M.C.; Mr. H. F. Waterhouse, Lond.; Westminster City, Mayor of; Miss D. G. C. Walker, Bath; West Kent General Hospital, Maidstone, Sec. of; Dr. S. West, Lond.

- Z.—Capt. A. W. Nuttall, R.A.M.C.; Mrs. Nattrass, Jarrow-on-Tyne; Newcastle-on-Tyne Royal Victoria Infirmary, Sec. of; Nashipur Raj Dispensary, India, Medical Officer to the.

- P.—Poplar Borough, Lond., Clerk to the; Dr. E. Paterson, Lond.; Messrs. Parke, Davis and Co., Lond.; Mr. H. Platt, Manchester; Messrs. F. J. Parsons, Hastings; Mr. F. G. Pulman, Lond.; Dr. P. Pope, Lond.; Perrier, Ltd., Lond.; Dr. R. F. Priyatice, Huelva.

- R.—Dr. R. W. H. Row, Lond.; Dr. M. D. Roberts, Liverpool; Mr. A. M. Reading, Grantham; Dr. M. J. Ryan, Crumlin; Messrs. Reynolds and Branson, Leeds; Dr. J. H. Reynolds, Lond.

- S.—Dr. W. C. Sullivan, Lond.; Dr. Ma Sa Sa, Rangoon; Sheffield Children's Hospital, Sec. of; Dr. E. I. Sprigge, Banff; Mr. A. Skeffington, Lond.; Mr. T. V. Smith, Lond.; Capt. A. Stokes, R.A.M.C.; Dr. E. Stainer, Lond.

- T.—Dr. Wu Lien Teh, Harbin; Dr. F. K. T. Yeote, Manchester.

- W.—Dr. T. Wilson, Birmingham; Mr. J. W. T. Walker, Lond.; Messrs. W. W. Wyllie and Son, Aberdeen; Mr. A. Wilson, Lond.; Willedean Urban District Council, Clerk to the; W. H. H.; Messrs. W. J. Wilcox and Co., Lond.; Capt. J. R. Williamson, R.A.M.C.

The Lumleian Lectures  
ON  
MODERN ASPECTS OF HEART DISEASE.  
*Delivered before the Royal College of Physicians of London*

BY G. A. SUTHERLAND, M.D. EDIN.,  
F.R.C.P. LOND.,

MEDICAL ATTENDANT TO THE HAMPSHIRE AND NORTH-WEST LONDON HOSPITAL;  
PHYSICIAN TO THE PADDINGTON GREEN CHILDREN'S HOSPITAL.

LECTURE III.<sup>1</sup>

*Delivered on March 30th.*

MR. PRESIDENT AND GENTLEMEN.—Although new methods of treatment of heart disease have been introduced, it is questionable whether any addition of great value has been made to the armamentarium of our predecessors. The advantages of rest, of suitable diet, and of digitalis were well known to them. What has been done is to analyse and test more exactly the measures which are beneficial and to define with more precision the conditions and the cases for their suitable application.

"CARDIAC TONICS."

The term "cardiac tonic" is still in common use and is employed somewhat indefinitely. It is applied to drugs which are supposed to stimulate or increase the contractile power of the heart. Some cardiac tonics are supposed to act directly on the musculature and others through the nerves of the heart. If one takes a list of the so-called cardiac tonics and tries to ascertain the exact action of the individual drugs it will be difficult to state precisely what special result is to be looked for. Digitalis and its allies, strophanthus and squills, stand apart from all the others in this respect.

Balfour (1897) held that the fundamental action of the digitalis group was to increase the elasticity of the muscular fibre of the heart, so that it expanded more slowly and contracted more perfectly. Broadbent (1897) considered that digitalis caused a more complete expulsion of their contents by the energetic contraction of the ventricles, and also improved the suction action during diastole, thus withdrawing the blood which had been dammed back in the veins. Brunton found that digitalis acted on the cardiac muscle, on the intrinsic cardiac nerves, on the vagus centre in the medulla, and also on the arterioles. We do not find any clinical proof of the accuracy of these views. There was no precise knowledge of the underlying changes in cardiac failure which digitalis is specially fitted to remedy. Each authority seemed to draw his conclusions from few and imperfect observations, or even to make his observations for the purpose of supporting his previously formed conclusions. In many cases what would now be regarded as the outstanding changes in cardiac failure were relegated to an entirely subsidiary position.

It is interesting to note that 20 years ago the special symptoms which called for digitalis had been recognised. These may be summed up as cyanosis and dropsy, with a rapid, irregular pulse and breathlessness. This condition is most frequently due to auricular fibrillation, and is still the one in which the action of digitalis is most clearly demonstrated. Digitalis was used as a cardiac tonic, and having been found beneficial in this special type of case it came to be used indiscriminately in all forms of severe illness with cardiac weakness. When I was a house physician it would have been regarded as almost criminal to let a patient die without giving digitalis, whether the disease was pneumonia, typhoid fever, or pernicious anaemia. We believed that digitalis was the great cardiac tonic and always suitable if cardiac failure threatened. Other cardiac tonics and stimulants have had their day and are still used by those who believe they have seen good results follow from their use. Amongst them may be mentioned strychnine, caffeine, camphor, adrenalin, and pituitrin. The exact mode of their action on the heart, if any, has not been determined, and the type of case suitable for their application has not been clearly

differentiated. Digitalis, however, holds its own in the present as in the past.

EFFECTS OF DIGITALIS IN VARIOUS CONDITIONS.

Progress has been made, and although differences of opinion may still exist we are a good deal nearer the answers to the questions why to use digitalis, when to use it, and how to use it. The progress of scientific medicine is often delayed by the existence of unscientific beliefs, and the employment of digitalis in heart disease is an illustration. The one outstanding fact about the action of digitalis which has been fully established is that it slows the action of the heart under certain conditions. I propose to consider how this slowing is brought about; what effects follow from the slowing; and whether the ascertained beneficial effects from digitalis are not to be explained solely as the result of this cardiac slowing. In doing so no attempt will be made to dispute the various effects on the cardiac muscle obtained by physiologists and pharmacologists in their experimental work with large doses of digitalis. The pharmacologist cannot produce in animals those changes in the tissues and functions of the heart which are the result of disease, nor can he form any estimate as to what the results of digitalis in therapeutic doses will be in the treatment of cardiac disease.

In ordinary language slowing of the heart means slowing of the rate of contraction of the left ventricle, and this is estimated clinically by the pulse-rate or, if necessary, by auscultation of the heart. We have already seen that an increase in the ventricular rate or a serious disturbance of the cardiac rhythm is never primarily ventricular in origin. The ventricle follows but does not lead the cardiac rate or rhythm, which is always initiated in some part of the supra-ventricular tissues. In diseased conditions an increase of rate or a disturbance of rhythm is also started in the supra-ventricular tissues. Consequently it would appear that treatment should be directed to the supra-ventricular tissues from which the disturbance proceeds.

Here are two further points to be considered. First, it has not been shown that digitalis in medicinal doses—and we are dealing solely with digitalis as a therapeutic agent—has any direct effect on the wall of the left ventricle. Consequently we must not assume that digitalis acts on the ventricular muscle. Secondly, it has been shown that the slowing action of digitalis is through the vagus nerve, but it has not been shewn that the vagus has any direct action on the musculature of the left ventricle. These two points will be discussed more fully later. Meantime, assuming them to be true, we draw this conclusion—that digitalis slows the rate of the left ventricle without acting on the ventricle; and that it produces its effect through the vagus nerve, which also has no direct action on the left ventricle. It therefore follows that as the rate of the left ventricle is dependent on impulses proceeding from other parts (the supra-ventricular tissues), the action of digitalis through the vagus must be on these supra-ventricular tissues. In an attempt to slow the ventricular rate through the supra-ventricular tissues there are two possible lines of action: (1) to check the rate of impulse discharge at some over-active centre, or (2) to block some of the rapid contractile impulses at the conducting tissues so that a diminished number of them reach the ventricle. Clinically it can be shown that in slowing the heart rate this is the mode of action of digitalis, as in the following types of cases.

I. With Normal Rhythm and Rapid Regular Action.

CASE 1.—A girl of 11 years had suffered from several attacks of rheumatic fever with cardiac involvement. After six weeks at a convalescent home she was readmitted to hospital because of increasing dyspnoea and rapid cardiac action. For the previous three weeks the cardiac rate had averaged 120 to 130 beats per minute. She had not been able to be out of bed for a fortnight owing to breathlessness.

There was no pyrexia and no evidence of active rheumatic infection. The cardiac rate was rapid, averaging 124, and regular, and the rhythm was normal. Praecordial pulsation was strong and the apex beat was felt 1½ inches outside the nipple line, while the right side of the heart was felt pulsating to the right of the sternum. The murmurs present indicated mitral and aortic regurgitation. The liver was enlarged, extending 2 inches below the costal margin.

After a fortnight's rest in bed and salicylate treatment there was no improvement, and it was resolved to try the effect of digitalis in slowing the heart-rate. In 12 days the rate had fallen to 68, the amount of digitalis taken in that

<sup>1</sup> Lectures I. and II. were published in THE LANCET of March 17th (p. 401) and 24th (p. 437), 1917.  
No. 4883.

time having been 12 granules of digitalin (Nativelle), gr. 1/240 in each. Four days after the digitalis treatment was begun the heart was beating regularly at 80 per minute, and with a normal rhythm, as shown by the tracings. At the end of the course the apex beat was felt 1 inch outside the nipple line, and the right border of the heart did not extend beyond the right margin of the sternum. The liver edge was just palpable at the costal margin. The patient expressed herself as feeling very well, and was allowed out of bed, when she found she could walk about without any breathlessness. The action of the digitalis was successfully maintained after she left the hospital by small doses of digitalin. In this case the diminution in the size of the whole heart, coincidently with the slowing of the rate, was very striking.

This type of case is a common one in adolescent life. Rheumatic infection has led to carditis, in which myocardium, pericardium, and endocardium may be involved singly or in combination. Active signs of rheumatic infection (fever, &c.) are absent, but there is a persistently rapid cardiac action, the rate being from 120 to 140 at rest. In mild cases there are symptoms of cardiac weakness, as shown by the languor, disinclination for exertion, and shortness of breath when any exertion is made. In more severe cases symptoms of cardiac failure may be present and the breathing distressed, even when the patient is in bed. The rapid cardiac action seems to be an important factor in producing the cardiac weakness which leads to these symptoms. Digitalis grips the vagus nerve and stimulates its inhibitory action which tells on the first centre reached—namely, the sino-auricular node. The rate of impulse discharge here is diminished and a slower rate of the heart is established at the sinus, which leads to the slower ventricular rate. In cases of this kind, and they are not uncommon, we find no evidence of any direct action of digitalis on the contraction of the left ventricle or on the rate of the left ventricle. We trace the slower and stronger contractions of the ventricle directly to the slower cardiac rate established at the sino-auricular node.

#### II. With Auricular Rhythm and Rapid Regular Action.

CASE 2.—A boy of 10 had suffered for some years from occasional attacks of paroxysmal tachycardia. They had become more frequent and more persistent until at the end of an attack lasting for a month signs of cardiac failure set in. Apart from the cardiac condition, there was no evidence of disease in any part of the body, and he had never shown any sign of rheumatic infection.

The heart rate was 180 per minute and regular. There was diffuse precordial pulsation, not forcible, and considerable dilatation of the heart to right and left. Strong venous pulsation was to be seen and felt in the neck. A soft systolic murmur was audible over the precordia. The radial pulse was very small, feeble, and rapid, but apparently all the cardiac pulsations reached the wrist. The breathing was laboured and the ears were dusky. The liver was enlarged and free fluid was present in the peritoneum, while there was some oedema of the lower extremities and of the abdominal wall. Tracings showed an abnormal cardiac rhythm which was not of sinus origin but arose somewhere in the supra-ventricular tissues and most probably in the auricles.

After moderate doses of digitalis the cardiac rate fell to 96, the action was much stronger, and the dilatation was less marked. Diuresis set in, the dropsical symptoms rapidly disappeared, and the boy felt much relieved as regards his breathing. On stopping the digitalis, however, the rapid cardiac rate quickly returned, and this happened after each successive course of digitalis. An effort was therefore made to establish a firmer hold on the cardiac rate by means of digitalis. He was ordered 45 drops of the tincture of digitalis daily, and during 19 days he took 11 drachms in all, a dose being omitted occasionally when nausea or headache was present. This had the effect of producing marked instability of the cardiac rate, so that it changed from fast to slow with great frequency, on the slightest stimulus, and usually without any recognisable cause. The patient stated that he could always change the rate by breathing deeply. In the fast periods the rate was always the same, 170 to 180 per minute, and the abnormal auricular rhythm was present. In the slow periods the heart rate would at one time be 42 and at another a normal one of 80, while in both cases a normal rhythm would be present. A few days later the normal rate became established with very few and brief periods of tachycardia.

We had here a case of very rapid cardiac action, the impulse starting presumably in the auricular tissues, and the ventricle eventually showing signs of exhaustion from over-action. There was no evidence of rheumatic or other

infection, and the heart was sound until the onset of the tachycardia. Here again digitalis would appear to have gripped the site of impulse formation in the auricle, passing by the sino-auricular node which was thrown out of action by the new focus, but large doses of the drug and a large total amount were required before the inhibitory effect of the vagus was fully developed. The large doses were probably rendered necessary by the fact that the centre of disturbance was a particularly active one, as shown by the severity and the persistence of the tachycardia.

#### III. With Auricular Rhythm and Rapid Irregular Action.

In the form of auricular fibrillation this is a common condition, and the beneficial action of digitalis is now well known. How it acts would appear to be as follows: The sino-auricular node is out of action as auricular fibrillation is a state in which multiple stimuli originate all over the auricles and dominate the cardiac rhythm. Fibrillation itself is so firmly established that the vagus has no effect in checking it. The inhibitory action of the vagus may be regarded as passing over the heart until it reaches the auriculo-ventricular node and bundle, which convey the stimuli from the auricles to the ventricles, and producing there diminution of the conducting power (conductivity), the so-called partial heart-block. By this means many of the impulses passing towards the ventricle are checked *en route*, the rate of ventricular stimulation is lessened, and the rate of the ventricular contractions gradually falls.

It may be objected that there is no proof here that this is the action of digitalis in auricular fibrillation, but few who have studied the subject have failed to accept the explanation. The inference has this further in its favour. The fibrillary contractions continue unaffected in the auricles and the ventricular contractions continue of the same kind as before, so that only the junctional tissues remain. On them digitalis and the vagus are known to act. It may be said that the mere slowing of the ventricular rate in auricular fibrillation does not explain the good results from digitalis, and that the drug has a real "tonic" action on the heart muscle. A case like the following has a bearing on this question.

CASE 3.—A married woman of 30 years sought advice because of increasing shortness of breath on exertion, although she was still carrying on her usual house duties. She had had rheumatic fever in childhood. The heart showed the characteristic signs of mitral stenosis in the form of a well-marked presystolic thrill and murmur. There was no left-sided dilatation, but the right side of the heart was somewhat enlarged. The cardiac action was regular at 84 beats per minute. The pulse was small and regular. The condition was, in fact, such as it might have been found on examination at any time during the previous 10 years, except that the right side of the heart was slightly more enlarged. The treatment ordered was largely negative—namely, the avoidance of anything inducing cardiac effort, for it has been my experience that no benefit is derived from drug treatment at this stage of mitral stenosis.

The patient was not seen again for three months, when she gave the following history. Up to 10 days previously she had gone on with her housework as usual. That night, about an hour after falling asleep, she woke with urgent breathlessness, and could not lie down. She felt the heart beat rapidly and thumping at times. The distress of the dyspnoea had gradually diminished and she had finally been able to come to the hospital.

The dyspnoea was still present, but she could lie down. The pulse was extremely feeble and rapid, with occasional stronger beats, but was very difficult to count. The cardiac rate was 140 and the action was grossly irregular—the so-called delirium cordis. The heart was much dilated, the liver was enlarged, and there was slight cyanosis. At the apex a systolic murmur was audible, and there was no trace of a presystolic thrill or murmur. Two days later she was admitted to hospital, when the pulse was found to be 140 per minute and very irregular. On the following morning she woke feeling that all dyspnoea had gone. This was clearly due to the spontaneous cessation of the attack of auricular fibrillation. The pulse was 96 and regular. I saw her next day when she was lying in bed without any sign of cardiac distress. The pulse was 90 and regular. There was a well-marked presystolic thrill and murmur at the apex, indicating the return of definite auricular contractions. The liver was normal in size. In a few days she was out of bed and going about the ward.

Two months later the patient had another attack of cardiac failure with similar symptoms, and was readmitted. Tracings showed the characteristic adial and venous curves of auricular fibrillation. The cardiac rate was 140 and the

action very irregular. On full doses of digitalis the heart slowed down, and later on moderate doses the rate was kept under 90. Although the patient's symptoms had been entirely relieved by digitalis the fibrillation and cardiac irregularity persisted.

Here a first attack of fibrillation passed off, and with its cessation the signs of cardiac failure rapidly subsided. No one will suggest that the cessation of fibrillation was accompanied by any special increase of contractile power in the ventricle, except that the rapid rate may have produced a certain amount of exhaustion. But the ventricle was left in peace—that is to say, it was freed from the showers of stimuli which were reaching it from above, and by reason of the slower rate its contractions became stronger. In a second attack digitalis secured the same result—namely, a slowing of the ventricular rate, and when that was established the signs of cardiac failure again disappeared. The fibrillation persisted, but the exhausting effects of its rapid rate were held in check. The only difference between the results in the two attacks was that in the first instance the heart reverted to a normal rhythm and rate, while in the other an abnormal rhythm of the heart and an irregular action of the ventricle persisted. These are not factors of the first importance provided that the ventricular rate is normal or slow.

#### *IV. With Normal Rhythm and Slow Regular Action.*

We may refer to the action of digitalis when the cardiac rate is normal and a sinus rhythm is present, and symptoms of cardiac failure have developed. This condition is most frequently met with in degenerative forms of cardiac disease, and after middle life. If one pushes digitalis here the usual result is to produce partial heart-block or sinus irregularity; the ventricular rate may be a few beats slower, but the chief effect is to substitute an irregular ventricular action for a regular. Even if this is not injurious if not pushed to an extreme, it is not at all an advantage, for a regular rhythm with harmonious interaction of auricles and ventricles is always to be preferred. This type of case does not, as a rule, show any benefit from digitalis, save that if dropsy is present a diuretic effect may follow, possibly due to an irritant action on the kidneys.

#### *V. With Auricular Rhythm and Slow Irregular Action.*

Cases of auricular fibrillation are sometimes met with in which the ventricular rate is slow and irregular. They have always appeared to me to be of a mild type of cardiac failure—that is to say, the subjects do not present the severe symptoms of heart failure seen in fibrillating cases with rapid ventricular action. They may have a limited cardiac response to effort, traceable rather to cardiac degeneration than to the fibrillation. One may infer that in such cases the degeneration has attacked the auriculo-ventricular bundle, and has already produced a condition of partial heart-block, so that the conducting tissues will allow of the passage of only a limited number of the stimuli which are coming from the auricles. Consequently in such cases one would not expect any benefit from digitalis, whose special action has already been anticipated by the changes resulting from disease, and in my experience digitalis is of no use. In some of these cases when the patient exerts himself the ventricular rate is greatly accelerated and symptoms of distress are then evoked. Digitalis may do good in this condition by preventing the acceleration of rate through an increase of the block in the conducting tissues. If digitalis had any direct effect on the contractile tissues of the heart it ought to be manifested in this type of case when signs of serious heart failure develop, such as oedema, cyanosis, and breathlessness, while the cardiac rate is not increased. Here, also, my experience has been that no benefit has followed the use of digitalis.

#### *MODE OF ACTION OF DIGITALIS.*

We have now got thus far that digitalis would appear to act through the vagus on certain parts of the supra-ventricular tissues. We have seen that this action may be on the sino-auricular node, or on some abnormal focus of impulse production in the auricular tissues, or on the junctional tissues. It has been established and accepted that this action is shown more frequently and more effectively in the case of cardiac disease resulting from rheumatic inflammation—that is to say, the other great class of cardiac disease, that due to various forms of degeneration, does not respond so well. It is not known, and it has not been suggested, that the

vagus nerve is itself affected or in any way altered by rheumatic infection. The conclusion to which one is led is, therefore, that the cardiac tissues, those on which the vagus acts, are in themselves altered in some way so as to be rendered more sensitive to the action of the vagus. Rapidity of cardiac action means over-action in the stimulus-producing centre. Depression or moderation of over-action seems to be the great function of the vagus. One cannot depend on bringing into play this vagal action by means of digitalis in all cases of rapidly acting hearts, but there are some in which this action may be confidently expected, and they are especially those in which the heart has been affected by rheumatic inflammation. In connexion with vagal action there is also to be taken into account the fact that an over-acting centre tends to become exhausted and an over-stimulated conducting tissue tends to lose its conducting power. Thus the sino-auricular node may be so far prepared for an increase of vagal depression by its previous over-action, and the auriculo-ventricular bundle may be similarly prepared by over-stimulation from auricular impulses, as in the case of auricular fibrillation.

It would appear, further, that in the case of a rapidly acting heart which we desire to slow the problem is, will the vagus under digitalis stimulation be able to moderate the impulse-producing centre, or will the latter prove too powerful and maintain its rate? Under many conditions, as is well known, digitalis has no effect in slowing the heart, and here we may assume that the over-acting centre is too excitable. On the other hand, under other conditions the vagus can control the over-acting centre and check the disturbed action. When the vagus fails to check the rapid production of impulses to contraction at their centre, it has still a useful function left—namely, to prevent the disturbance reaching the ventricle through the induction of partial heart-block by diminishing the excitability of the conducting fibres. This protective method of heart-block is of extreme value in maintaining efficient ventricular action in many cases. One point about this action of digitalis may be referred to. It is an imitation of Nature's way of maintaining efficient cardiac (ventricular) contractions in similar conditions of distress. The natural means of preventing excessive ventricular rate and consequent ventricular exhaustion is by stopping a certain number of the impulses descending from above at the junctional tissues—a partial heart-block. This may or may not be sufficient. If it is not, by means of digitalis we can supplement the blocking action already existing and increase it to the extent necessary to relieve the ventricular distress.

If these views as to the action of digitalis are correct it would appear that the slowing effect on the left ventricle—from which we have traced all the benefit derived from digitalis—is accomplished without any action on the ventricular muscle. Further, it would appear that digitalis, the great cardiac "tonic," has no action whatever in medicinal doses on the cardiac tissues; it neither weakens them nor tones them up, but acts only on the vagus nerve by increasing its inhibitory functions. It does not seem necessary to assume any effect other than that of a slower rate, and the beneficial rest to the heart which follows.

#### *Effect of Compression of Vagus Nerve.*

By compression of the vagus nerve in man evidence is gained which supports the view that the action of digitalis is on the vagus and not on the heart muscle. Ritchie found that by digital compression of the vagus he could slow the whole heart, the normal rhythm being maintained, and the action being on the sino-auricular node. He could obtain no evidence of a direct action on the other tissues in the auricle, and in no instance has he observed auricular fibrillation to be checked or arrested by vagus compression. He failed to find any direct effect on the ventricles by vagal stimulation. Ritchie states that although in animals the conduction of stimuli to the ventricles through the junctional tissues may be impaired by vagal stimulation, in healthy human hearts he failed to obtain any depression of the conductivity of the auriculo-ventricular bundle unless there was some antecedent impairment of its function. In many cases of auricular flutter compression of one or other vagus was found to induce well-marked blocking of stimuli to the ventricles. Whenever the ventricular rate was slowed, the slowing was always the result of the action of the vagus on the supra-ventricular tissues. In cases of

complete heart-block the rate, rhythm, and strength of the ventricular beats were found to be uninfluenced by vagal stimulation.

We have already considered the clinical effects of digitalis on cardiac action. Now if we compare the results of vagal stimulation by digital compression there is a striking similarity in the effects produced. In both cases the results are primarily inhibitory and not augmentory of cardiac functions. In both cases there may be a local action on the sino-auricular node, the auriculo-ventricular node, or the auriculo-ventricular bundle, but never directly on the ventricles themselves. In the one case mechanical stimulation produces effects which are temporary and cannot be long sustained; in the other, digitalis produces identical effects which can be regulated and indefinitely prolonged. Still some would ask us to believe that as the vagus picks out certain areas and certain functions of the heart in the exercise of its physiological rôle, so digitalis picks out the same areas and the same functions in the exercise of its therapeutic rôle.

#### OBSERVATIONS ON DIRECT ACTION OF DIGITALIS.

We have seen the typical class of case in which digitalis is useful—namely, the rheumatic heart with a rapid rate or with a rapid and irregular rate, and signs of left ventricular failure. This class will comprise some 90 per cent. of the cases in which we can state before treatment that digitalis will do good, and the way in which it will do good, and the good which it will do. Regarding how many drugs can the same statement be made? We are not tied down to this class of case, because in a sense the investigation into the action of digitalis is only in its infancy—certainly it is very far from being completed. But we have reached this conclusion that it is foolish to give digitalis solely because of cardio-weakness or of cardiac dilatation or of valvular disease, irrespective of the special conditions present. It is equally foolish to refrain from giving digitalis because of some supposed action on the contractility or relaxation of the left ventricle, or because of the presence of some lesion supposed to militate against the use of digitalis such as aortic incompetence or mitral obstruction.

Physiologists somewhat vaguely, and pharmacologists more precisely, have dealt with the action of the vagus and of digitalis on the contractile power of the left ventricle. In this connexion one law must be kept in mind—namely, that the cardiac muscle, when it contracts, contracts with all the power which it possesses at the time. Gaskell puts digitalis into the class of substances which act in the direction of bringing about a tonic contraction of the left ventricle, as opposed to the unscarin class which brings about an atonic condition of that muscle.

Cushny has concluded from his experiments with large doses that digitalis strengthens the contractions and often lessens the relaxation of the heart by direct action on the cardiac muscle. Anything that Cushny writes about digitalis must be received with respect, but when he enters the clinical field we are at least entitled to offer criticism. The clinical problem he set himself to decide was whether the therapeutic effects of digitalis are to be attributed to stimulation of the inhibitory action of the vagus or to its direct action on the cardiac muscle. The method he employed was to paralyse the vagus by means of atropine before and after the use of digitalis. If a heart slowed by means of digitalis did not show an increase of rate under atropine he concluded that the slowing was due to a direct action of digitalis on the heart muscle, the vagus having been thrown out of action by the atropine. From a considerable number of clinical tests he drew the following conclusions:—

(1) The members of the digitalis group slow the pulse in a certain number of cases in which the rhythm is given by the normal pacemaker, and as a general rule this slowing may be removed by atropine, and is therefore inhibitory. In other cases, however, the sinus slowing and block are unchanged by atropine, and then arise from the direct action of digitalis on the conducting fibres from the pacemaker to the auricle, and from the auricle to the ventricle.

(2) In auricular fibrillation digitalis slows the heart from some direct action on the heart and not from stimulation of the inhibitory mechanism, for atropine does not restore the original rate of the released heart. The reduction in rate may be due to a direct depression of the conduction or of the excitability of the heart muscle by digitalis. But it is suggested that these functions are reduced indirectly through the improved nutrition of the heart from the augmented power of contraction of the heart muscle.

(3) The inhibitory stimulation induced by digitalis, therefore, does not play any part in the beneficial action of the drug, which is to be ascribed to its direct action on the cardiac muscle solely.

It is surprising to learn that in cases of auricular fibrillation, where the slowing of the ventricular rate under digitalis is so striking, the vagus does not come into play at all and an entirely different process is at work. I question whether this conclusion is justified by the clinical tests employed. The atropine test was employed when the vagus was fully digitised—that is to say, when the vagus centre was being strongly and continuously stimulated. To paralyse the vagus, therefore, one required not an ordinary physiological dose of atropine, but a dose proportional to the degree of vagus stimulation by the digitalis. One may put a normal individual to sleep with 20 grains of bromide of potassium, but such a dose will do little to quiet an alcoholic subject suffering from delirium tremens. In order to make his test conclusive Cushny ought to have greatly increased his dose of atropine. Not that I advise this continuation of his tests, because in all probability the patient would die from atropine poisoning before the vagus escaped from the grip of digitalis. The results which Cushny obtained are exactly those which one would expect in auricular fibrillation with the vagus fully digitalised, if one believed that the slowing of the heart was through the vagal action. Mackenzie, dealing with the same type of case as Cushny, differs as to the clinical facts and the conclusions to be drawn from them. He says:—

So far as our observations go the action of atropine in increasing the rate when it has slowed, seems to indicate that digitalis acts through the vagus nerve, both in the slowing which occurs in auricular fibrillation, and in partial heart-block.

But the clinical conclusions of these two authorities may be satisfactorily reconciled if we assume that the larger the amount of digitalis taken the bigger will the dose of atropine require to be in order to throw the vagus out of action. Mackenzie was dealing with small doses of digitalis and Cushny with large ones.

#### *Consideration of Cushny's Conclusions from Clinical Side.*

On the clinical side also one must take exception to the basiness of Cushny's conclusions as to the direct action of digitalis on the heart, after he considered that he had eliminated the vagal factor. "The reduction in rate may be due to a direct depression of the conduction or of the excitability of the heart muscle by digitalis." It certainly would be curious if digitalis imitated exactly the well-known functions of the vagus described in this sentence. "But it is suggested that these functions are reduced indirectly through the improved nutrition of the heart from the augmented power of contraction of the heart muscle." That is to say, that with a cardiac (ventricular) rate say of 150 the heart is so toned up by digitalis that the rate is slowed. But we find clinically that we cannot strengthen the cardiac contractions until the rate has been slowed down. We get no evidence of stronger contractions, and the patient gets no relief from the symptoms, and the physical signs of cardiac failure do not alter until after slowing has taken place.

Is it not a commonplace of medicine that with a rapid cardiac action we cannot have a strong pulse? Take the case of a healthy young man with a rapid pulse under some form of excitement, and we find it small and weak. When the excitement has passed off and the heart rate has slowed, we find the pulse stronger and fuller. Does any clinician doubt that the cardiac action was weaker when the rate was rapid and that it was stronger when the rate had slowed and because the rate had slowed? Has experience not shown that the faster the cardiac rate the weaker are the contractions? Can we imagine digitalis producing in a rapidly acting heart the same powerful contractions which we know will follow from the mere slowing of the rate? This suggestion of Cushny's would appear to be merely a revival of the old pharmacological view, which was accepted therapeutically, that there must be some direct action of digitalis on the cardiac muscle. The acceptance of this view, without any proof as to its accuracy when the drug was used in medicinal doses, led to the great misuse of digitalis in the past.

Accepting the "all-or-nothing" action of the ventricle in contracting, we must take the other fact that if the ventricular rate is increased the contractions are weakened because the resting-time is diminished. Rest and relaxation

of the muscle are essential if the ventricle is to evolve its full power of contraction. Contraction, relaxation, and rest are the three elements in the normal ventricular action. Physiologists have taught that the tonicity of the ventricle is increased by digitalis and that the contractile power is increased, using large doses for the experimental proofs. If the tonic contraction of the ventricle is increased it follows that the relaxation is diminished *pari passu*, for a tonic contraction in the physiological sense means a prolonged contraction without relaxation. If the relaxation is diminished the complete filling of the ventricle cannot be effected. If the ventricle is not filled the efficiency of a ventricular contraction in carrying on the circulation must necessarily be impaired.

It is difficult to see how these results of poisonous doses of digitalis in physiological experiments can be made use of in cardiac therapeutics. The well-known experiment of bringing a frog's heart to a standstill in tonic contraction of the left ventricle has no bearing on our therapeutic dosage, for anything of this nature would be singularly inappropriate in an attempt to help a struggling ventricle. If physiologists say that the contraction of the ventricle is increased by digitalis through the vagus there is this further difficulty. The physiological action of the vagus is inhibitory; its recognised effect under digitalis is to inhibit cardiac functions—for example, inhibition of rate, inhibition of conductivity, inhibition of excitability, &c. So that if it should under the same conditions increase the contractility of the ventricles, there would be a change in the normal function of the vagus which can only be described as puzzling. Gaskell, however, definitely states that the "staircase phenomenon" which arises after an experimental standstill of the whole heart through vagal stimulation is due to exhaustion of contractility. He points out that the vagus stimulation depresses all the functions and their restoration is gradual, the restoration of contractility being shown by a gradual increase in the strength of the beat—the staircase phenomenon.

#### *Conclusions as to Different Actions of Digitalis.*

Cushny's conclusions as to the action of digitalis in cases with a normal rhythm of the heart are also difficult to follow, and for this reason. He finds that in some cases this action is inhibitory and through the vagus, while in others there is a direct action of digitalis on the conducting fibres from the sino-auricular node to the end of the auriculo-ventricular bundle. So that in the same class of case we have two entirely different actions of digitalis, the one on the nerve and the other on the muscle. This is a difficult doctrine to accept, but it does not complete the exposition of the action of digitalis. In the fibrillating cases, that is, those with an abnormal rhythm, these explanations are dropped, and he suggests a third—namely, "an augmented power of contraction of the heart muscle." From these statements one gathers that in Cushny's clinical experience digitalis may stimulate the vagus directly, or may depress the conductivity of the heart directly, or may increase the contractility of the heart directly. The path of clinical medicine is not made smooth by such varied and uncertain action on the part of digitalis. Surely if we can explain our therapeutic results by one line of action, clearly aimed at and clearly manifested in clinical work, we shall prefer it. The line of action is that digitalis acts on the supra-ventricular tissues through the vagus nerve, and by checking impulse production or impulse conduction slows the rate of the ventricles.

It would appear that nature has not supplied any natural paths by which the ventricles can be stimulated directly to increased contraction. In the field of experimental medicine Ritchie and others have failed to produce a direct effect on the ventricular contraction by stimulating the vagus. The effects of stimulation of the accelerator nerves of the heart by experiment or by drugs have not shown any definite action on the ventricles. Is it not possible that the natural powers are the best defenders of ventricular action and that our efforts to aid it by direct stimulation are wasted? If we consider the condition of a patient suffering from paroxysmal tachycardia, the heart having been previously healthy, we may find marked signs and symptoms of cardiac failure. On the occurrence of spontaneous cessation of an attack there is a rapid disappearance of all the signs of cardiac distress. Is it any use giving drugs to increase the cardiac (ventricular) contractions? The heart

has been beating at a rate of about 200 per minute. It is impossible for the contractions to be powerful at that rate; the only question is, Will they be sufficient to carry on the circulation? When the pulse-rate drops to 80 the whole scene changes, and by the mere slowing of the rate the cardiac (ventricular) contractions at once becomes stronger and an efficient circulation is established. If given a sufficiency of rest and relaxation the ventricle is quite capable of doing all that is required in the way of contraction. A similar state of affairs is seen in cases of auricular fibrillation, as already referred to, when the cessation of an attack is quickly followed by the return of the heart to the *status quo ante*. The ventricle needs no stimulation to bring out its contractile power when rest and relaxation are afforded. So when digitalis is used in the case of auricular fibrillation and the same relief of symptoms follows the slowing of the ventricular rate, it seems superfluous to bring in as a pharmacological explanation an assumed action of digitalis on the contractile powers of the ventricles.

#### *Clinical Experience in Support of Digitalis Acting Beneficially by Slowing of the Heart.*

If digitalis has any therapeutic action on the wall of the left ventricle it ought to be capable of clinical demonstration. The typical case for this purpose is not uncommon—namely, one in which there is a failure of the left ventricle with a normal rate and rhythm of the heart, and with definite signs present, for example, oedema, oliguria, and breathlessness. A record of a series of cases of this type, with details as to the benefits which followed from the use of digitalis, would go far to settle the question as to the direct action of digitalis on the ventricles. But I do not find such cases to be common amongst published records and I cannot supply any from my own experience.

Recently the electrocardiograph has been employed to test the effect of digitalis on the cardiac records and certain changes have been discovered in the ventricular peaks, notably in the T wave. Further, under full doses of digitalis a ventricular extra-systole sometimes occurs. It is scarcely convincing to assume from these facts that digitalis acts directly on the ventricular wall. As bearing on the subject of the action of digitalis on the wall of the ventricle there is this fact to be remembered. When the cardiac rate has been much reduced by digitalis, say to 40 ventricular beats per minute, as the result of full doses, we sometimes find that the ventricle "escapes." Ventricular escape means that the ventricle starts its own independent rhythm and contracts when the pauses between the normal beats are very prolonged. This shows that the ventricle itself has been so little affected by digitalis as compared to other parts of the heart that its idio-rhythm emerges unaffected and unimpaired whenever an opportunity presents itself. We have little evidence of the other functions of the ventricle being affected directly by digitalis, and we can state definitely that the idio-ventricular rhythm is not affected at all.

The other great cardiac tonic is rest. Why does rest relieve the weakened or failing heart? There is no question here of a direct tonic action on the cardiac muscle, such as has been claimed for digitalis. There is no positive action of any kind on the cardiac muscle. But there is a negative one in the diminution or cessation of the rapid cardiac action which follows from physical exertion and mental excitement. In other words, rest leads to a slowing of the cardiac rate, and from this slowing follow those benefits which have already been described as the result of digitalis therapy. So far as we are entitled to dogmatise from clinical experience, we may say that all the ascertained benefits derived from digitalis and from rest in rapidly acting and failing hearts are to be traced to one and the same result—namely, the slowing of the heart-rate. This slowing may be brought about in different ways and by various means, but it is the best cardiac tonic we possess.

#### *NEED OF FURTHER INVESTIGATION.*

While digitalis gives its most striking results in cases of very rapid and grossly irregular cardiac action, further investigation is required as to its value in less severe cases and before signs of definite cardiac failure have manifested themselves. There is a large class of sufferers from cardiac insufficiency—that is to say, the reserve power of the heart has gone and the response to anything save mild exertion is very limited. Take the case of mitral stenosis where the above conditions are present, but where the pulse-rate is still

normal or slow. I do not anticipate any benefit from digitalis in such a case.

In others, however, we find the pulse-rate persistently rapid and much increased on exertion. It is extremely probable that this increase of rate has a definite result in the way of producing over-action and weakening of the left ventricle, as well as of the right. In several cases of this nature I have given digitalis in order to prevent weakening of the heart and to postpone, as far as possible, the onset of cardiac failure. It has seemed to me that distinct benefit has followed in these cases from the slowing of the heart induced by digitalis. The action was always on the sino-auricular node, so that the normal rhythm was preserved, and the patients had always had rheumatic infection, so that the heart may have been in a sense prepared for digitalis. As a preventive of cardiac failure, the usefulness of digitalis in slowing the heart under these special conditions might be further tested.

#### CONCLUSION.

I have now dealt, very imperfectly as I know, with some additions to our knowledge of heart disease, and some changes in our views regarding it. As an observer I cannot reproduce to you the results exactly as they are but only as they appear to me to be. Looking backwards we recall with gratitude the light thrown on the subject of heart disease by eminent clinicians in the past. Advance in clinical medicine and by clinical methods has not come to a stand-still. Looking forwards we see one of the best guarantees of future progress in the existence of a band of British workers who are devoting themselves enthusiastically to the further elucidation of the problems of heart disease. May I add that this College desires to extend to them all the support and encouragement in its power.

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## FURTHER EXPERIENCES WITH EMETINE BISMUTH IODIDE IN AMOEBOIC DYSENTERY, AMOEBOIC HEPATITIS, AND GENERAL AMOEBIASIS.

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(Report to the Medical Research Committee.)

IN THE LANCET of August 19th, 1916, Dobell and myself briefly described three cases of infection by *Entamoeba histolytica* treated by emetine bismuth iodide. Two of these have since been followed up accurately, one W. (No. 3) by Dobell, the other C. (No. 2) by myself. Neither of these has ever shown *E. histolytica* cysts again and C. has had no further clinical signs of dysentery. Dietetic errors and cold and damp have, it is true, produced a certain amount of abdominal discomfort and slight pain, but, after extensive ulceration of the bowel, one could not expect otherwise. With these symptoms no blood or mucus appeared in the stools and, as stated above, no parasites were found. Coincident with the disappearance of the dysenteric symptoms the patient improved in general condition and gained weight. Both these cases, I think, may be considered as complete and permanent cures. Tables I. and II. show at a glance the detailed examinations of the stools.

The value of the double iodide of emetine and bismuth, by the mouth, in the treatment of histolytic carriers is now fully recognised; it remained to be seen, however, whether the drug would be equally efficacious in cases where liver involvement had also taken place. In the following series of cases to be described three cases of amoebic hepatitis figure and, as will be seen later, very good results have also been obtained. In addition an example of the somewhat rare condition "general amoebiasis" is included. By this term is meant a febrile state without dysenteric and manifest liver symptoms, yet responding quickly to treatment by emetine. *E. histolytica* cysts may be found only with great difficulty, but if sufficient numbers of faecal examinations are made they should eventually be demonstrable.

*Method of administration.*—To begin with, keratin-coated tabloids and steartettes were tried and appeared to act satisfactorily. In one instance, however, suspecting that the drug was not being absorbed, the stools were carefully examined and three steartettes were recovered quite unchanged. The uncertainty of such an occurrence taking place in other cases decided one therefore to employ the drug in all the other patients as the loose powder in an ordinary gelatin capsule, similarly to the first cases treated by Dobell and myself. The dosage in all the series has been 3 grains nightly for 12 consecutive nights, as originally recommended by Dale.

A certain amount of sickness occurred in some of these, but this was never of sufficient importance to interfere with the continuation of the treatment, and the same may be said of the diarrhoea which is sometimes met with. To prevent sickness the precautions that were of use in the ipecacuanha days may be employed, the drug, however, in this instance being given on a full and not on an empty stomach. During the course the patient is better kept strictly in bed, the diet being arranged in accordance with the acuteness or chronicity of the symptoms. For most cases a light diet consisting of milk, white meat, and white fish will be found most suitable. At 10 P.M. a small meal should be given, arrowroot, sago, tapioca, or cornflour with a little milk, for example and then immediately after this the capsule is taken. Five to ten minutes later some boiling water should be sipped, and this should be repeated if any sign of nausea or sickness occur throughout the night. For the first few nights, until one sees how the patient is to tolerate the drug, the pillows should be removed so as to keep the head low, no movement should be allowed, and if saliva accumulates in the mouth it must on no account be swallowed, but should be expectorated or removed by cotton swabs. If after all these precautions the patient is still sick a mustard leaf may be applied to the epigastrum on subsequent evenings, or 10 to 20 minims of tinct. opii may be given half an hour before the administration of the emetine. Such precautions will greatly mitigate, if not entirely prevent, sickness.

The occurrence of this symptom is a very variable one; sometimes the first doses produce it and then a tolerance is established, while in other cases it appears towards the end of the course or irregularly throughout it. Three to four hours after taking the capsule is the usual time for the sickness to appear; there may be one emesis and then no more,

or this may be followed up by others with some nausea and discomfort on the following day. In private practice and in ordinary civil hospital practice, when the drug is given in a proper manner and with the ordinary precautions the symptom is of little importance, and may be entirely disregarded in the majority of the cases. In the old days such patients used to take their ipecacuanha without any trouble, the symptoms produced being much more unpleasant than those met with in the above drug.

As regards diarrhoea, a certain amount of this is beneficial rather than otherwise; if excessive it may easily be checked by the administration of opium.<sup>1</sup>

#### Notes of Cases.

**General amoebiasis.—History.**—Patient (McC.) went to Africa April, 1916. He soon had some slight attacks of malaria, but otherwise kept well. In October of the same year he began to feel run down and got tired very easily. He then went and consulted Dr. Gray at Lagos, who, on examining his stools, found *E. histolytica* cysts present. Seven injections of emetine, gr. 1, were given and the patient returned to work. General weakness and the tired feeling soon appeared again, so it was decided to send the patient home.

**Examination.**—Temperature varying from 101–102° F. at nights. Looks seedy and has lost weight. Teeth black, but sound. Small glands palpable in posterior triangles of neck. Lungs nil. Heart sounds a little weak; pulse 100, feeble. Liver, perhaps a little enlarged upwards, level of 5th and 6th ribs and costal margin. Spleen not palpable. No pain on shaking liver nor on deep pressure and percussion. No pain or tenderness over colon. Blood examination: R., 4,600,000; W., 13,000; Hb, 90 per cent. Differential count per cent. was: Polymorphs, 70%; large mononuclears, 10; lymphocytes, 17.5; eosinophiles, 0.5; transitional, 1; mast cells, 0.5. Number counted, 200. No malarial parasites or trypanosomes. Urine: No albumin, blood, or sugar. Faeces: Heavy infection with *Entamoeba coli* cysts, one amoeba? species. Two doubtful cysts that might have been histolytica. Wassermann reaction negative on two occasions.

As regards a past dysenteric history, the patient stated that he had never had clinical signs of dysentery nor, as a matter of fact, even any diarrhoea. He was very emphatic about this. Further, he never had had any liver pain or tenderness, his only clinical signs being weakness, some loss of weight, and irregular temperature.

**Treatment.**—As his temperature was high and I did not like his appearance, and as Dr. Gray had found definite histolytica cysts in his faeces in Africa, I did not wait, but started a course of emetine bismuth iodide at once. This was begun on the night of Jan. 11th, 1917, and its effect upon the temperature was at once apparent, this quickly dropping to normal. As marked as this was the effect of the drug on the patient's general condition, he stating that he felt very much better and, further, his leucocytes, which were raised when he came into hospital, also became normal.

**Further history.**—The improvement has continued up to the date of writing this paper, the patient has had no further fever, he has steadily gained in weight, histolytica cysts have not reappeared in the faeces, and to all intents and purposes he is cured.

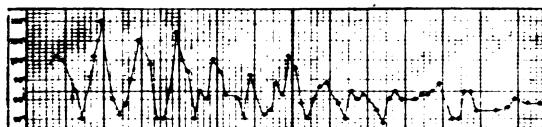


Chart showing the temperature of patient (McC.).

Table III. shows his faecal and blood examinations and the chart his temperature. A study of the former shows that the coli cysts, though disappearing at first, returned and became as numerous as before, a point specially noted by Dobell in several of his series of examinations.

#### Amoebic Hepatitis Cases.

**1.—History.**—Patient born in England, went abroad to India in 1900. Served there since with usual leave home. Came home to England April, 1916. Previous illnesses: Attack of dysentery three years ago, very bad one. Since that date had had relapses off and on. Last attack a month ago. A little blood and mucus. Twelve stools a day one day during this period. Treated in India. ? ipecacuanha, never emetine. Frontier sores two years ago, malaria several attacks, never venereal. Present condition: Lately has been very weak, and this has gradually been getting worse. Has lost weight, about a stone; sweats at nights.

<sup>1</sup> Dr. H. H. Dale, who has read this paper in manuscript, tells me that recent experience seems to indicate that the trouble of nausea and vomiting may be eliminated, or reduced to trivial proportions, by giving the double iodide in pills coated with sa'ol. Of a number of formulae which have been tried the most successful was a pill with simple syrup as excipient and sa'ol coating. Such pills usually pass through the stomach without causing trouble, and appear to break up satisfactorily in the intestine, so that the curative effects are good.

**Examination.**—Looks ill. Teeth very bad. Stripped, very thin. Apices shrunken, poor chest, somewhat pigeon-shaped. No definite signs of tubercle; no dulness at right base. Heart sounds faint; no murmurs. Liver level of 6th and 7th ribs and a little below costal margin; slightly tender at one place and uncomfortable on shaking. Spleen level of 9th–11th ribs. Urine: No albumin, blood, or sugar. Faeces: No amoebae or cysts first examination. A further examination three days later showed scanty histolytica cysts. Blood examination: R., 4,900,000; W., 14,000; Hb, 95 per cent. Differential count: Polymorphs, 74; large mononuclears, 4; lymphocytes, 20; eosinophiles, 1; transitional, 1 = 100.

**Diagnosis.**—Amoebic hepatitis. ? abscess commencing.

**Treatment.**—Usual course of emetine bismuth iodide, 3 gr. nightly for 12 consecutive nights. Steartettes were used to begin with, but later were crushed up into powder, as about this same time I had another case in which these were passing unchanged. The patient quickly lost his liver pain. He expressed himself as feeling very much better, his leucocytes fell to normal, and he began to pick up weight. No cysts have been found in his stools since taking his course. Though still a little nervous and excitable, symptoms not associated with dysentery specially, he is now well and has had no further signs of liver pain. Table IV. shows the results of his treatment at a glance.

**2.—History.**—Patient had lived in India for 12 years. Previous illnesses: Enteric in 1906. Slight attacks of colitis on several occasions, never off duty for these. One attack of malaria only. Pleurisy 4 years ago, left side. Present illness: While at home in England 2½ years ago got an attack of liver. Returned to India at the outbreak of war and went to Mesopotamia in November, 1914. Kept well for the first six months. After that began to get diarrhoea, liver became enlarged and tender. Had rises of temperature also. *E. histolytica* found in stools. Given emetine, 7 doses of ¼ gr. each. Improvement on voyage home, but on arrival not feeling fit and liver still tender. Dr. Stevenson examined his stools and found active amoebae and cysts (*E. histolytica*).

**Examination.**—Slightly cachectic-looking, cheeks sunken, conjunctiva a fair colour. Lungs and heart nothing of importance. Liver enlarged, edge felt below costal margin, left lobe tender and felt hard. Spleen level of 9th–11th ribs. Urine: No albumin, blood, or sugar. Faeces: Free amoebae and cysts. *E. histolytica* (Stevenson).

**Diagnosis.**—Amoebic dysentery and amoebic hepatitis.

**Treatment.**—Emetine bismuth iodide, gr. 3 nightly, for 12 consecutive nights. (First part of course steartettes, latter part same crushed into powder.)

**Progress.**—The amoebae and cysts quickly disappeared from the stools and have not reappeared. The liver tenderness still persisted, however, a month and a half after the treatment. It is probable that this is due to adhesions having formed between the liver and diaphragm, or between the liver and adjacent viscera. The patient has improved in health and gained in weight, but is not yet normal.

Table V. gives the details of his faecal and blood examinations.

**3.—History.**—Patient (McG.), born in Scotland, went to Burma in 1912; in Rangoon in civil employment. Joined Army in 1914; France early in 1915; left there in December, 1915, and went to Mesopotamia, arriving in January, 1916. Invalided for jaundice and dysentery to Bombay; there two months, then sent home. Previous illnesses: Fever at times in Burma, no dysentery there, no venereal. Present illness: Dysentery in Mesopotamia. Seven to eight stools a day. No blood, mucus only; severe tenesmus. Given emetine four injections of 1 gr.; this stopped the dysentery at once, all symptoms disappearing. After this jaundice and abdominal pains. While in hospital at Bombay Widali negative to all typhoid group and nothing grown from stools; rigors and pain over gall-bladder, also bad pyorrhoea. Lately tendency to constipation and pain over gall-bladder region still.

**Examination.**—Heart and lungs nil. Tender over liver on deep percussion and also tender on pressure over lower border of liver in gall-bladder area. Liver enlarged both upwards and downwards. No tenderness over colon. Spleen not palpable. Blood examination: R., 5,000,000; W., 6000; Hb, 100 per cent. Differential count per cent.: Polymorphs, 63; mononuclears, 11; lymphocytes, 22; eosinophiles, 2; transitional, 1; mast cells, 1. Films: No malarial parasites. Urine: No albumin, blood, or sugar. Faeces: *E. histolytica* free, minute stage. *E. coli* cysts. *E. coli* cysts. No ova.

**Diagnosis.**—Amoebic dysentery carrier, amoebic hepatitis.

**Treatment.**—Painted tender area with lin. iodi. Course of emetine bismuth iodide, gr. 3, in powder in gelatin capsules for 12 consecutive nights.

**Progress.**—The patient took his first three doses without trouble, but was sick after the fourth. After this there was no further sickness, but a diarrhoea started, which, however, was easily controlled by tinct. opii. About the middle of the course the pain over the liver diminished and he felt better. On Jan. 23rd, the day after the course was finished, he passed some mucus in his stool and felt his liver a little,

TABLE I.—*W.* No. 3.

TABLE II.—C. No. 2.

\* I am indebted to Mr. Redman King for the results of the examinations made during August and September while the patient was staying at Barton.

<sup>B</sup> = Treatment with emetine bismuth iodide, gr. 3. + = Positive result, small infection. ++ = Moderate infection. +++, = Heavy infection. - = Negative result. B. h. = *Entamoeba histolytica*, ameboid stage. B. h. c. = *Entamoeba histolytica* cyst.

TABLE III.—General *Amebiasis*.

Date : Jan., 1917		Feb.																													
		11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9
H. h. c.	E	E	E	E	H	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
H. h. c.	?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
E. c. e.	+++	+	+		+	-	-	+	-	-	-	-	-	-	-	+	-	-	+++	+++	+++	+++	+	+	-	+	++	++	+	+	

*Leucocytes.*—Jan 11th: 13,000; 12th: 13,100; 13th: 13,000; 15th: 12,500; 16th: 12,200; 17th: 11,800; 18th: 11,200; 19th: 9000; 20th: 8900; 21st: 8000; 22nd: 7000.

Temperature raised at beginning, came quickly to normal after the emetine began. See chart. K. c. c. = Entamoeba coli cysts. Other signs as before.

TABLE IV.—*Amœbic Hepatitis* (No. 1).

*Leucocytes.*—Dec. 4th: 14,200. 7th: 16,800. 8th:  
14,000. 9th: 14,000. 11th: 10,000. 12th: 9800. 13th:  
2400. 14th: 7000. 18th: 6800.

No mark means stool not examined on that day. Other signs as before. This patient started his treatment with stearettes, after the 13th these were crushed up and given in powder form.

TABLE V.—*Amæbic Hepatitis* (No. 2).

**Leucocytes.**—Jan. 19th : 6000; 20th : 7000; 22nd : 7200; 23rd : 9400; 24th : 5800; 25th : 6000.

TABLE VI.—*Amœbic Hepatitis* (No. 3).

**E. c.** = *Entamoeba coli*, amoeboid stage.

TABLE VII.—Convalescent Carrier Case (No. 1).

TABLE VIII.—Convalescent Carrier Case (No. 2).

TABLE IX.—*Relapsing Dysentery 26 years after Original Infection.*

Stearettes passed unchanged on Dec. 12th, 13th, and 15th.

while there was also a slight rise of temperature the same evening. The blood showed leucocytes 10,600 with no sign of malaria. Two days after, the pain over liver disappeared and up to the present has remained quiescent. Convalescence though somewhat slow has been sure and there is reasonable hope of a permanent cure. Table VI. shows the results of his treatment at a glance.

#### Convalescent Carrier Cases.

**1.—History.**—Patient (Ch.) joined the Army in 1914. Went to India in October, 1914. Stayed there till March, 1915, when invalidated home for heat-stroke. Before leaving also contracted dysentery. Treated for this on way home by emetine injections, four in all. Finally invalidated out of Army for epileptic fits. Present illness: After leaving Netley was treated at home by rest in bed and milk diet. Got much better after this. Afterwards went to Bournemouth, began ordinary diet, this being followed by diarrhoea and severe bleeding. Another relapse in October, 1915. Next two fits. Then another relapse of his dysentery. Treated by ipecacuanha, ? dose, and by more emetine injections. During 1916 bowels still very loose and anything easily upset him. Lately had constipation alternating with diarrhoea; pain in the abdomen as well.

**Examination.**—Heart sounds, nothing to note. Says he gets out of breath very easily if he takes any exertion. Lungs no signs of tubercle. Some pain over colon on deep pressure. Urine: No albumin, blood, or sugar. Faeces: *E. histolytica* cysts heavy infection, *E. coli* cysts; no flagellates, no ova.

**Diagnosis.**—Amoeboic dysentery, cyst carrier.

**Treatment.**—Emetine bismuth iodide, gr. 3, powder in gelatin capsules, nightly for 12 consecutive nights.

**Progress.**—Improved after course very much, all diarrhoea and pain disappearing. Patient also felt stronger and stated that he had never felt so well since acquiring his dysentery. Cysts disappeared rapidly from his stools after commencing treatment and have not reappeared (Table VII.). On Jan. 18th, 1917, an intensive daily examination of the faeces was begun, this lasting for over three weeks. Cysts have been absent during the whole of this period, and a permanent cure may be confidently anticipated. All symptoms have disappeared and the stools now are normal in number and consistence.

**2.—History.**—Patient (Q.), born in Newfoundland, joined Navy in 1910; been in it since. After war in Mediterranean chiefly. Present illness: At Tunis, Sept. 16th, 1916, seized with dysenteric symptoms, mucus, blood, and tenesmus, but not much straining. Went into hospital. Emetine 15 injections in all, ? dose. Much better after these. Stools now one or two a day, normal. Pain in abdomen occasionally.

**Examination.**—Some bad teeth. Heart and lungs nothing to note. Liver level of 6th and 7th ribs and costal margin; spleen level of 9th-11th ribs; no pain in abdomen. Urine: No albumin, blood, or sugar. Faeces: *E. histolytica* cysts, moderate infection; *E. coli* cysts, heavy infection.

**Diagnosis.**—Old dysentery, amoeboic carrier.

**Treatment.**—Emetine bismuth iodide, gr. 3, powder in gelatin capsules, for 12 consecutive nights.

**Progress.**—*Histolytica* cysts quickly disappeared (Table VIII.) from the stools and have not returned. The patient is well and now shows no signs of any abnormality in his bowels.

#### Relapsing Amoeboic Dysentery 26 Years after Original Infection.

**History.**—Patient (McL.) had acute dysentery in Egypt in 1890. Ten years later in England a relapse, treated by ipecacuanha, promptly recovered. Since that date until December, 1916, no intestinal disorders of any sort. Present illness: Started with an attack resembling influenza. Pain all over and aching bones. Then suddenly seized with all the symptoms of acute dysentery: blood, much mucus, great straining, abdominal discomfort, and passage of numerous stools. Faeces: Stools typically dysenteric, much blood and mucus. Amoebæ present, *E. histolytica*, minute stage, and *coli* cysts.

**Treatment.**—Stearlettes of emetine bismuth iodide, 3 gr. in each, were immediately begun. The symptoms at once responded to these, the amoebæ disappeared from the stools, also the blood and mucus, and the patient quickly recovered. As constipation set in during the middle of the course, one suspected the possibility of the stearlettes not dissolving, and an examination of the stool proved that this was so, three stearlettes being recovered quite unchanged. (This is the case referred to at the beginning of the paper.) That the first stearlettes did dissolve, however, is fairly certain, as there was considerable nausea after taking them and the symptoms cleared up so quickly. Since then there has been no clinical relapse. Stool examinations were only possible on three occasions after the end of the treatment. The case is reported to demonstrate the extraordinary chronicity of an amoebic infection.<sup>2</sup> Table IX. shows the treatment and faecal examinations at a glance.

<sup>2</sup> See also Brit. Med. Jour., Dec. 23rd, 1916, for details of another example.

A brief study of this series of cases shows that emetine given by the mouth, as emetine bismuth iodide, is apparently as efficient as emetine by the needle in cases of amoebiasis with liver involvement. Ipecacuanha used to act also, it is true, but one of its disadvantages was the sickness so often produced, this being badly borne by patients suffering from severe liver pain. These facts must mean that sufficient emetine is absorbed into the general circulation to act on the parasites in the liver, it being conceded, of course, that parasites are actually there when hepatitis, enlargement of the liver, and leucocytosis are present, the precursors of a definite abscess formation. The advantage of oral administration over hypodermic in such cases would seem to consist of the more potent sterilising powers ultimately shown by the double iodide on the amoebæ in the bowel, thus removing a possible source of subsequent reinfection of the liver.

Dobell has shown that in cases treated by emetine hydrochloride subcutaneously 70 per cent. relapse, whereas when emetine bismuth iodide is employed by the mouth this figure is reduced to about 10 per cent.; or stating this as regards cures, only 30 per cent. are got by the former, 90 per cent. or more by the latter. If, then, the latter can get rid of the acute symptoms satisfactorily and at the same time quickly, it is the best drug to use, as it is much more likely to sterilise the patient completely of his parasites in the bowel lesions at the same time. In cases of great urgency it might be advisable to give some injections first and then to follow these up by the oral method.

A point one may mention here, especially so as many people appear to entirely misunderstand it, is that the emetine does not kill the cystic stage of the parasite; it kills the amoebæ or active living forms which are present in the tissues of the bowel. The cysts in the faeces are being cast off, and only indicate that there are living amoebæ in the bowel producing them. If all the amoebæ are killed, then there can be no further production of cysts; the stools become negative and remain so permanently.

As far as one can judge, then, at present, emetine bismuth iodide holds out good hope of permanent cures in the different varieties of amoebiasis, in the sense that the patient is entirely sterilised of his amoebæ. The subsequent course of the disease will depend upon the extent of the original lesions—namely, the amount of bowel denuded of epithelium, deep ulceration producing peritoneal adhesions, strictures of the bowel, adhesions between liver and diaphragm, or between liver and adjacent viscera, and so on. Attacks of pain, bouts of diarrhoea, and definite colitis are not infrequent even after all signs of amoebæ have disappeared. The patient, it must not be forgotten, must be strictly dieted for a long period after his course of emetine; he must avoid wet and damp, and should abstain entirely from alcohol.

Some clinicians still prefer ipecacuanha in these chronic relapsing cases. In the old days the drug acted very well clinically, but in the light of modern research careful and prolonged faecal examinations would have to be made in order to determine the real value of such cures. If the emetine is the real essential in the ipecacuanha then a much larger dose can be given in a more convenient form by the use of the double iodide.

Finally, as regards dosage, if those who try the drug would attend carefully to the rules laid down for its administration there would be fewer disappointments. Some working standard must be adopted, and experience shows that that recommended by Dale of 3-grain doses every night for 12 consecutive nights (*36 grains in all*) is a good one. Dobell suggests that some cases may require an increased quantity, and in such the period may be extended even to 20 instead of 12 nights. Not less than *36 grains in all* should be given, as smaller quantities are generally followed by relapse. The case mentioned at the beginning of the paper (W., No. 3) is the only one, according to Dobell, that has been cured by so small a total as 15 grains in all—viz., 3 grains on five consecutive nights.

I have again laid stress on this dosage, as this has been misquoted and incorrectly stated, at least three times, in different journals.<sup>3</sup> It is to be hoped that those incorrect statements have not led people into errors in prescribing the drug.

<sup>3</sup> In an abstract of the paper by myself and Dobell (THE LANCET, August 19th, 1916) in the *Journal of the American Medical Association* (Sept. 16th, 1916, p. 908), again in the *Prescriber* (vol. xi., No. 24, January, 1917, p. 12), and, lastly, in the *Journal of Tropical Medicine and Hygiene* (Feb. 1st, 1917, p. 30) from subsequent papers by Dobell.

## A CASE OF PSYCHASTHENIA WITH CRIMINAL IMPULSES.

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(With the Permission of the Prison Commissioners.)

WHILST states of psychasthenia are frequently met with, the psychasthenic with homicidal impulses would seem to seek medical advice early in the course of his disorder. It is exceptional for crimes of violence due to this condition to be met with in prison practice. For this reason the following case appears worth recording from the view of the medical jurist.

A single man, aged 33, a collier, was sentenced at a police court to one month's imprisonment or to pay a fine for assault on a woman. According to the evidence of the prosecutrix, a woman 25 years of age, while she was walking along a street she was suddenly attacked from behind by a man who put both his arms round her neck and threw her to the ground. Her head struck some railings as she fell. The man said nothing to her at all, and she had never seen him before. When she fell he seemed suddenly to realise what he was doing and went away, subsequently giving himself up at the police station and asking to be taken into custody.

The prisoner on admission into prison was 63½ inches in height and weighed 120 lb., which is much below the usual weight for his height (say 138 lb.), and also below his normal weight, which a year before was known to be 126 lb. He was in fair general health, but pale and somewhat anaemic. He had a high degree of myopia, for which he wore spectacles. He showed no evidence of recent heavy drinking and was quiet and peaceable in demeanour. His memory, attention, and perceptive powers were good, as were his judgment and reasoning capacities. There was no exaltation, and no delusions or hallucinations were detected. He was not unduly depressed. His pupils were equal and reacted normally. The knee-jerks were normal. He slept and ate well. Nothing of importance was learnt concerning the family. He was, for his station in life, fairly well educated. He had played truant at school and had been caned there for boyish faults. He had had no serious illness until, some six years before the offence for which he was detained, he had an attack of enteric fever. He was not epileptic, but perhaps was occasionally intemperate. He had never been in an asylum nor under certificates, and so far as was known had never been under mental observation before, unless this was so during his prolonged stay in the workhouse after the attack of enteric, when apparently he had written to a relation speaking of suicide. On leaving school he worked in a pit, and this was his chief occupation. He stayed at one place for four years and remained at others for lesser periods. Only twice had he been discharged by his employer. During the last six years, after the attack of enteric, his conduct had been less satisfactory. He did not keep his situations so long, at times only did casual work, spent varying periods in workhouses, and had been in prison once for begging. On four occasions he gave up his work owing, he said, to a feeling of restlessness. On these occasions he would wander about the country until the unsettled feeling had passed off. He was emphatic that he had not been drinking to excess on these occasions, and his memory was clear as to the events that then took place. The desire to ramble did not appear to be related to epilepsy. He stated that for a considerable time past he had felt a recurrent desire to kill people; it was variable in intensity, but he had sometimes difficulty in restraining himself. He had followed people with the idea of attacking them, but had never actually done so before. He was afraid to trust himself, and in prison felt safer and better able to control himself than when outside. After very careful consideration this condition did not appear to be related in any way to alcohol.

Prior to reception into prison for five months he had been working at a pit, earning 35s. a week, and living with a near relation. Four days before the offence the restless, unsettled feeling already mentioned as having occurred before, came on. He left work and visited towns in the neighbourhood. On the day the offence was committed he had, he stated, previously followed another woman with intent to attack her, but she evaded him. He followed the prosecutrix for some short time, feeling impelled to attack her and trying to restrain himself from doing so, eventually attacking her in the manner already described. In so doing his spectacles fell off, and possibly for this reason the attack was less serious than it might otherwise have been. He made no attempt at robbing or of indecent assault, and there was

no motive for his act. His memory was quite clear as to what took place; he realised that what he did was wrong, and fought against it. When the act was accomplished, however, he added that he felt easy in his mind. Being afraid that the impulse would again come over him he later gave himself up to the police. He stated that on the day he left his home and work he had too much to drink, but his memory was unaffected; the following days he was sober. It appeared, however, from close questioning that it was doubtful if he had been really intoxicated at all during this period. At each of several interviews he repeated the fact that the impulse to kill was very strong, that he had to fight against it, and that he felt no longer able to trust himself to combat it. Before his sentence expired his relations visited him and offered to take him home and keep him till he again got work, but he was afraid to trust himself and wished to be certified.

In determining whether his story was true or false the following points were considered:

1. The reason he gave for committing the crime was that which best fitted in with the known facts of the case as a whole.

2. No reason could be discovered as to why he should concoct a false account.

3. It would be extremely improbable that a man in his position in describing his condition should mention all the main characteristics of psychasthenic impulses—viz., recurrence, consciousness, painful mental conflict before, and sense of relief after, action, with full knowledge of wrongdoing, and retention of memory, unless he actually knew of this combination through his own experience.

4. His attitude and demeanour at the various interviews impressed observers as being genuine. He made them feel that he really was distressed at his condition and afraid to be in the world again with only his own will to prevent him repeating the act. This impression was strengthened by the fact that he would not accept his relations' hospitality on release.

5. He was anxious to be certified. The habitual criminal malingerers insanity to get transferred from prison to an asylum at times. The prisoner was not of this class, however, and the desire to be sent to an asylum at the end of a sentence instead of being released, apart from such, always suggests mental disorder.

6. He was a stranger, unknown in the district where the offence was committed, and could easily have got away. Instead he gave himself up to the police. A destitute man sometimes commits and admits a trivial crime to get arrested and the shelter of a prison, preferring it to that of a workhouse. A man wanted in one district for a serious crime may commit a trivial offence elsewhere to get arrested, thinking he may hide in prison. An offender sometimes confesses to a crime when he sees no opportunity of escape, hoping by so doing eventually to receive a more lenient sentence, or he may confess to a crime when drunk. Recently a man may commit a crime and admit it to get into prison to avoid military service. In this case the prisoner was not destitute, he had money on him when arrested, a home, and work to go to; he was not wanted for any offence in any other district; he was not drunk; he could easily have got right away and then would have required no leniency; finally, war had not been declared at the time. None of the ordinary reasons for confessing a crime were applicable in his case.

It does occasionally happen that a man commits a crime and informs the police, or courts arrest, when he feels he requires protection from himself—a melancholic subject recently under my care did this as he was afraid of committing suicide unless he was under restraint. Taking all the above facts into consideration, the account that the prisoner gave of the offence and of his impulses was considered to be genuine.

When a person is charged with a serious offence such as murder, and the evidence in the hands of the prosecution is so overwhelming that there is no probability of avoiding a conviction, the counsel for the defence, unable to combat the facts, may, and not infrequently does, raise a defence of insanity. This is at times successful, even when there are no medical facts to support it. A favourite suggestion the prisoner's counsel offers the medical witness to accept is that at the time of the crime his client was suffering from an insane impulse. Homicide frequently results from impulsive acts due to the alcoholic insanities, paranoia, melancholia, mania, dementia, and epileptic states, and these have always

to be excluded before such a suggestion is refused. The case recorded is one in which violence appears to have resulted from a homicidal impulse in one of the forms of mental disorder less commonly met with in this connexion in the criminal courts. It is perhaps fortunate that all the characteristics of psychasthenic impulses are not likely to be assumed by a person desiring to feign insane impulses to evade the consequences of serious crime.

## EXCISION OF THE RETRO-PHARYNGEAL GLAND,

WITH A SHORT ACCOUNT OF TWO CASES IN WHICH THIS OPERATION WAS CARRIED OUT.

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I HAVE performed the above operation on two occasions. The chief difficulty in removing the gland is its depth and near relationship to important structures.

It will be advisable to make a few preliminary remarks on retro-pharyngeal abscess, a condition frequently overlooked, especially in children.

Nearly all cases are due to suppuration taking place in the retro-pharyngeal lymphatic gland. (See diagrams.) There are two glands, one situated on either side of the middle line. Inflammation first occurs. This may be either acute or chronic (tubercular). Considerable swelling may take place, and clinical symptoms in rare instances will arise, before the formation of pus. (See Case 1.)

The abscess is, in the first place, confined to the gland; later, it bursts through the gland capsule. I have met with a tubercular abscess originating in the gland, where ultimately the abscess cavity extended from the base of the skull to the level of the thoracic inlet. In this case the larynx was markedly displaced forwards and to one side.

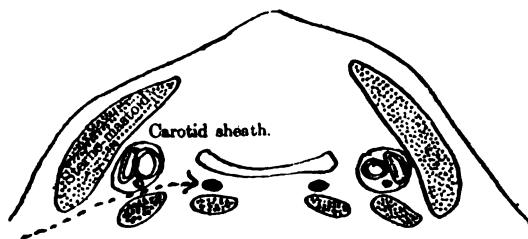
The question as to whether the pus is contained by the gland capsule or not is an important one in relation to treatment.

In dealing with acute suppuration the usual method is to open the abscess through the mouth; without doubt all tubercular abscesses should be opened from the neck. I would go a stage further and state that in some cases one ought not to be content with a mere opening and drainage of the abscess cavity, but when possible the diseased gland should be removed. (See Case 2.) I will now describe the procedure adopted in removal of the gland.

An incision is made along the posterior border of the sterno-mastoid. It starts behind the tip of the mastoid process and extends downwards for three inches or more. The deep fascia along the posterior edge of the muscle is divided. It is now possible to work inwards towards the pharynx between the sterno-mastoid on the one hand and the splenius capitis and levator anguli scapulae on the other. (See diagrams.) The dissection is now carried further inwards by separating the carotid sheath and its contents from their posterior relations. Any enlarged glands met with should be removed. In the neighbourhood of the pharynx there may be some venous haemorrhage. Great help can be obtained in the exposure of the gland by using strong retraction with a broad-bladed retractor. Without employing an undue amount of force the sterno-mastoid, carotid sheath, and even the larynx and pharynx can be pulled forwards. One of the risks is perforation of the mucous membrane. In order to avoid this the finger of an

assistant in the pharynx is of great service. During removal of this gland get the assistant to push it downwards and outwards towards the wound. By counter-palpation and the use of a blunt dissector the capsule is defined. Undue force must be avoided, as the gland may contain an abscess. By keeping close to the gland capsule and working in conjunction with the assistant there should be no real danger of perforating the mucous membrane. After removal

FIG. 2.



Transverse section, showing the position of the retro-pharyngeal glands. The arrow shows the line of dissection.

of the gland the skin is united by interrupted sutures. A small gauze drain should be inserted, otherwise blood may be extravasated into the cavity.

A different class of case (see Case 2) is that in which a tubercular retro-pharyngeal gland has broken down, with resulting infection of the surrounding tissues. A large abscess cavity may be present, causing a marked swelling in the pharynx and possibly in the neck.

In such a case the abscess is first of all evacuated through the neck, or the sac of the abscess may in exceptional circumstances be removed, with its contents, entire. Once the abscess cavity has been incised the opening should be enlarged. The walls of the cavity are inspected, and the gland which is probably present and in a caseous condition is removed. The abscess wall should now be carefully curetted, or it may even be possible to excise it. Packing will generally be required. The rate of healing will depend on the thoroughness with which the disease has been dealt with. If the abscess is a very extensive one, as in the case referred to above, repeated aspiration from the outside, either with or without a modified dissection, would probably be the best mode of treatment, coupled with fixation of the head and treatment on general lines.

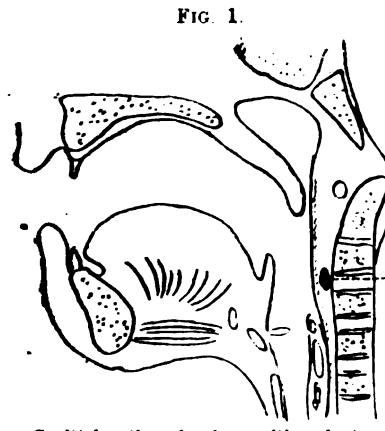
The following is a short account of the two cases where excision was carried out.

CASE 1.—Girl, aged 4. History of measles six weeks prior to admission. Ever since there had been increased difficulty in breathing, especially noticeable at night. There was a large swelling occupying the right side of the posterior pharyngeal wall and extending beyond the middle line. Operation was carried out shortly after admission to the London Hospital. When the swelling was palpated between two fingers it was so firm that I decided to remove it without ascertaining whether or not there was pus in its centre. The relief was immediate. Subsequent examination showed the gland to be of the inflammatory type; no evidence of tubercle was found, and there was no abscess. From the history and appearance I rather suspected tubercle. Union took place by first intention. In this case the formation of an abscess was forestalled by operation.

CASE 2.—Girl, aged 5. This patient had a large chronic retro-pharyngeal abscess which was opened in the usual way. Subsequently the pathological report confirmed the diagnosis of tubercle. An attempt was made to get the wound to heal from the bottom. Eventually the skin did unite, but shortly afterwards a swelling reappeared in the pharynx. The abscess was reopened, but notwithstanding every effort, failure was the result; the abscess re-formed. I decided to operate a third time. Through a much longer incision I thoroughly opened up and inspected the abscess cavity. At the bottom of it a caseous retro-pharyngeal gland was discovered and removed by dissection. In addition, the walls of the abscess were gently curetted. Healing was somewhat slow, but within a month the patient was discharged from hospital cured, and there has been no recurrence of the condition.

Since writing the above I have operated on a boy, aged 7 years, where recurrence took place a year and a half after the simple opening of a tuberculous abscess from the outside. The gland in this case was partly calcified.

Harley-street, W.



Sagittal section, showing position of retro-pharyngeal gland (R).

## THE PRINCIPLES OF THE TRANSFUSION OF BLOOD.\*

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THE idea of transfusing blood from the healthy to the sick has appealed to the imagination of our profession for centuries, but no considerable progress was made until recent years, owing on the one hand to the difficulties which the operation presented, and on the other hand to the dangerous reactions which sometimes followed the more successful attempts. But the revived enthusiasm for transfusion during the last decade in America, France, and Germany has finally established its value upon a sound experimental and clinical basis, and it is remarkable that the subject has received so little attention in this country. The whole of Europe has been preoccupied, however, during the last three years, and I may mention, therefore, that transfusion has been successfully employed in the treatment of various kinds of anaemia and in the arrest of spontaneous haemorrhage, whilst in combating serious infections and certain toxæmias, such as the toxæmias of pregnancy, promising results have been obtained.

How far the important factors of the blood concerned in achieving these various results reside in the serum it is not yet possible to say. So far as disintoxication and immunity are concerned transfusion may be merely a convenient method of transferring healthy or immune serum to the patient, and with the manifest domain of serum therapy I do not propose to deal. But blood therapy is still in its infancy : it could not be properly tested until an elaborate technique had been perfected and certain accidents liable to result from the chance admixture of different bloods had been excluded, and so with the remedy in our hands we have yet to learn exactly when and in what doses to use it.

### *Selection of Cases.*

The most obvious application of transfusion is to the treatment of anaemia, but there are as yet very few guides to the selection of suitable cases. The advantage of transfusion in the case of patients who have been rendered anaemic by recent haemorrhage is sufficiently clear ; but it is probable that the average existence of the transfused cells in the circulation of the recipient is not longer than 10 days even under the most favourable conditions, and therefore in cases of anaemia due to other causes the added blood, although it may serve to tide over a crisis, can do no permanent good unless blood formation is stimulated or blood destruction diminished in the patient's own body.

That an increased activity of the bone marrow frequently follows transfusion is demonstrated by the fact that the blood count usually rises with a simultaneous increase in the number of reticulated red cells. But when the condition of the peripheral blood indicates a hypoplasia of the bone marrow the only method of determining whether increased blood formation will result from transfusion is to transfuse and see. The following case is probably an example of simple stimulation of the bone marrow.

CASE 1.—The patient, a female aged 11 years, was admitted to St. Bartholomew's Hospital under the care of Dr. Morley Fletcher, suffering from a severe anaemia which had followed an attack of diphtheria eight months previously. No other cause than a simple hypoplasia of the bone marrow could be found to account for the anaemia, and as a result of the first six weeks' treatment the red cell count rose from 925,000 to 1,330,000 per c.mm., and the haemoglobin from 18 to 31 per cent. The patient then received 20 c.c. of blood from the house physician, and in 12 days the blood showed 1,580,000 red cells per c.mm. and 45 per cent. haemoglobin. 150 c.c. of blood were then transfused, and during the next 17 days the red cells rose to 3,000,000 per c.mm. and the haemoglobin to 63 per cent. Thereafter the anaemia diminished more slowly, until the patient went to a convalescent home.

In those diseases, such as pernicious anaemia, in which an excessive haemolysis is known to occur, it is difficult to determine how far improvement following transfusion is due to increased cell production and how far it may be due to

diminished haemolysis. That the latter is one of the factors concerned might be expected on clinical grounds, for, as with spontaneous remissions, the patient becomes less yellow and toxic in appearance, fever diminishes, and a feeling of well-being which is out of proportion to the change in the condition of the blood is soon experienced.

The observations of Wilbur and Addis,<sup>1</sup> Robertson,<sup>2</sup> and others have shown that the variations in urobilin output in cases of pernicious anaemia not only serve as an index of blood destruction, but correspond to the remissions and relapses in the course of the disease, whether these be spontaneous or attributable to treatment ; and Robertson<sup>3</sup> has shown that the remission following transfusion in a case of pernicious anaemia was accompanied by a corresponding diminution of urobilin excretion.

And, further, in some cases of pernicious anaemia the myeloid reaction becomes less evident as the patient improves after transfusion, suggesting that marrow hyperplasia is not wholly responsible for the improvement. This is illustrated by the following case :—

CASE 2.—Mrs. H., aged 42, suffering from pernicious anaemia with an enlarged spleen, was admitted to St. Bartholomew's Hospital under the care of Dr. J. H. Drysdale. Frequent examination of the blood suggested great haemopoietic activity, 4000 to 6000 normoblasts and 100 to 400 megaloblasts per c.mm. being constantly present, but in spite of all treatment the anaemia steadily increased, until, three months after admission, the blood showed 429,000 red cells per c.mm. and 19 per cent. haemoglobin. At this stage the patient, who had developed bronchitis, appeared to be moribund, but after receiving 250 c.c. of blood from her husband she showed a rapid and remarkable clinical improvement. During the next five weeks the blood count rose to 2,550,000 per c.mm. and the haemoglobin to 66 per cent., while the nucleated red cells steadily disappeared from the peripheral blood. The patient was then transfused again and she improved still further, the red cells reaching 3,850,000 per c.mm. and the haemoglobin 83 per cent. There were signs of relapse before she left the hospital at her own request 13 months ago, but it is now more than two years since the onset of the disease, and she is still able to look after her own home.

The ultimate prognosis in any case must depend upon the power of reaction in the bone marrow, and this, so far as I know, is only to be determined by trial. I have transfused 9 cases of pernicious anaemia, 8 of whom were selected because they were making no progress or were steadily becoming worse under other methods of treatment, the ninth being chosen because her condition was regarded as too serious to justify a trial of other methods. Of these 9 cases, 4 showed very marked improvement, 3, of whom 2 are still under treatment, showed definite but less marked improvement, 1 was merely kept alive for several weeks, and 1 derived practically no benefit. So far as these cases were concerned, the age of the patient, the duration of the disease, and the condition of the bone marrow as indicated in the peripheral blood proved to be the best guides to the progress subsequent to transfusion ; but in some cases the results far exceeded expectation, while in others they were disappointing.

### *Selection of Donors.*

The donor should be a healthy adult and the loss of such amounts of blood as I have generally used (250 c.c.) is never felt. In America larger quantities, even up to 1800 c.c., have been taken, and although such loss must debilitate the donor, there is probably no objection to taking as much as 500 c.c. at a time.

McClure<sup>4</sup> has recently recorded the transmission of syphilis from donor to patient. The donor, who had denied all possibility of infection, had a primary sore at the time of operation, and six weeks later both the donor and the patient, who was suffering from pernicious anaemia, simultaneously developed secondary eruptions. It seems unlikely that syphilis would be transmitted by a donor who, on careful examination, showed no signs of disease, but it is desirable that a Wassermann reaction should be done on the blood if time and facilities permit. In most cases, however, the donor is a relative or friend of the patient and he may be expected to answer questions frankly if the danger involved is explained to him. McClure also reports the transmission of malaria from a donor in whom the disease was quiescent to a patient in whom it flared up. But these two cases are the only instances I can find of the transmission of disease.

\* A paper read at the Section of Therapeutics and Pharmacology of the Royal Society of Medicine on Feb. 20th, 1917.

If the prospective donor is found to be healthy his blood should be tested with that of the patient for iso-agglutinins and iso-hæmolsins. Landois,<sup>5</sup> in 1875, was the first to recognise the incompatibility of certain bloods, and Landsteiner,<sup>6</sup> in 1901, divided individuals into three groups according to the iso-agglutinative properties of their bloods. In 1910 Moss<sup>7</sup> recognised a fourth group, and the accompanying chart shows the reactions of the various groups.

CHART 1.

Group.	Serum agglutinates.	Corpuscles agglutinated by—
I.	Nil.	II., III., and IV.
II.	I. and III.	III. and IV.
III.	I. and II.	II. and IV.
IV.	I., II., and III.	Nil.

Chart 2 shows the result of testing together 12 specimens of blood. The first person belongs to Group I. and possesses no agglutinins, but his corpuscles are agglutinated by the serum of all the persons in other groups. The next four persons belong to Group II., the sixth to Group III., and the last six to Group IV. It should be noted that the fourth person (No. 4) slightly agglutinates the corpuscles of someone belonging to the same group, and it may be noted, too, that two of the specimens belonging to different groups, one in Group II. (No. 3), and one in Group IV. (No. 9), are from brothers. The technique employed in making these tests was that described by Dudgeon and Wilson.<sup>8</sup>

CHART 2.

CORPUSCLES.

SERUM.	1 T. B. B.	2 A. E. S.	3 A. R. D.	4 B.	5 L.	6 N. F. S.	7 V.	8 A. M.	9 E. G. D.	10 H. S. B.	11 T.	12 C. S.
1	—	—	—	—	—	—	—	—	—	—	—	—
2	a	—	—	—	—	—	A	—	—	—	—	—
3	A	—	—	—	—	—	AA	—	—	—	—	—
4	A	—	—	—	a	AA	—	—	—	—	—	—
5	AA	—	—	—	—	AA	—	—	—	—	—	—
6	AA	AAA	AA	AA	AA	—	—	—	—	—	—	—
7	AA	AAAA	AAA	AAA	AAA	AA	—	—	—	—	—	—
8	AAA	AAA	AA	AAA	AAA	AAA	AAA	—	—	—	—	—
9	AAA	AAAA	AAA	AAA	AAA	AAA	AAA	—	—	—	—	—
10	AAA	AAA	AAA	AAA	AAA	AAA	AAA	—	—	—	—	—
11	AAAA	AAAA	AAAA	AAAA	AAAA	AAA	AAA	—	—	—	—	—
12	AAAA	AAAA	AAAA	AAAA	AAAA	AAA	AAA	—	—	—	—	—

CHART 3.

CORPUSCLES.

SERUM.	1 A. E. S.	2 Mr. H.	3 A. R. D.	4 R. M.	5 Mrs. H.	6 N. F. S.	7 L. J. B.	8 N. H.	9 C. S.
1	—	—	—	—	—	a	a	—	—
2	—	—	—	—	a	a	A	—	—
4	—	—	—	—	a	AAA	A	a	—
5	—	—	—	—	—	AAAA	AAAA	A	—
6	AA	AAA	AAA	AAA	a	—	—	—	—
7	AAA	AAA	AA	AA	—	—	—	—	—
8	AAA	a	AAA	A	a	—	—	—	—
9	AAA	AA	AAA	AAA	A	A	AA	AA	—

— = no agglutination. a = very slight but definite agglutination.  
AA = well-marked agglutination. AAAA = complete agglutination.

The four groups described have been supposed to be sharply defined, so that all bloods falling into one group are mutually compatible, while they are incompatible with all bloods in the other groups. It will be seen that if this were

true the group to which any blood belonged could be fixed by testing it against a known blood belonging to either Group II. or Group III. My own observations, however, show that a certain amount of overlapping of the groups occurs, and this is well illustrated by Chart 3, in which the first five persons belong to Group II., the next three to Group III., and the last to Group IV. The fifth person (No. 5) belongs to Group II., so that her serum agglutinates the corpuscles of the persons in Group III., but has no influence upon those of her own group. The corpuscles in this case, then, should be unaffected by the sera of Group II. and agglutinated by the sera of Group III.; but it was found that two of the Group II. sera produced slight agglutination, while of the Group III. sera one failed altogether to agglutinate, and the other two acted no more strongly than the sera of Group II. It is generally admitted, moreover, that different bloods contain different amounts, as well as different kinds, of agglutinin, and that the amount of agglutinin in a single blood may vary slightly from time to time. That these variations may be sufficient to obscure the true grouping of a particular blood is illustrated by the case of patient No. 9, who was transfused from the donor No. 8. (See Chart 3.)

CASE 3.—On Nov. 1st, 1915, a patient, C. S. (No. 9, Chart 3), suffering from pernicious anaemia under the care of Dr. A. Feiling in the Metropolitan Hospital, received 250 c.c. of blood from N.H. (No. 8) after the usual tests had shown the absence of agglutinins and hæmolsins. The red cells were immediately raised from 625,000 to 810,000, but a week later they had fallen to 600,000, and the patient appeared to have derived no benefit from the operation. There was, however, no unfavourable reaction of any kind. On Nov. 22nd the operation was repeated. When the patient had received about 20 c.c. of blood he complained of feeling faint, and became even more pallid. As the transfusion continued his pulse became very feeble, he retched and vomited violently, his face became distinctly puffy, and his skin was covered with cold sweat. When he had received about 100 c.c. he complained of pain in the sacral region, and this quickly became so intense that he could only be quieted with morphia. 250 c.c. of blood were given, and a few hours afterwards the patient began to pass hæmoglobin in the urine. Twelve hours later he was a deep yellow colour and slightly oedematous all over, but he said that he felt much better. The hæmoglobinuria ceased after 36 hours, the yellow colour and the oedema disappeared in the course of about three days, and the patient's general condition steadily improved until six weeks later, when he left the hospital for domestic reasons, he had just over 3,000,000 red cells per c.mm. and 75 per cent. of hæmoglobin.

[It is interesting to note the improvement which followed transfusion in the foregoing case in spite of immediate haemolysis of the transfused blood.]

Subsequent examination of the blood revealed the fact that the patient belonged to Group IV. and the donor to Group III., but apparently the corpuscles of the latter were not very susceptible to agglutination, and the titre of the patient's serum at the time of the first transfusion must have been so low as to give no agglutination by the ordinary tests. It appears, therefore, that a single examination is not always sufficient to establish the compatibility of two bloods on all future occasions.

There is no evident familial grouping of bloods. I have already remarked that two of the bloods in different groups in Chart 2 belong to brothers, and I have observed such differences in several other cases, but unfortunately opportunity has not permitted a further study for determining whether similarity and dissimilarity of blood reactions accompanies other physical features.

The group to which the blood belongs does not appear to be determinable at birth. Cherry and Langrock<sup>9</sup> recently examined the blood of 34 infants, each against the blood of its own mother, without finding a single instance of agglutination. Hektoen<sup>10</sup> states that the reaction of the child's blood is evident by the sixth year, and other observers have found the grouping to be apparent even before this, but it is useful to know that an infant may be safely transfused from its own mother without performance of the usual tests.

Hæmolsins are found less frequently than agglutinins, and it is established that they never occur without agglutinins. Ottenberg, Kaliski, and Friedman<sup>11</sup> experimenting on dogs found that hæmolsins were sometimes developed in the serum after repeated transfusions of agglutinable cells, but that they were never developed by the transfusion

of non-agglutinable cells. It is possible that the patient in Case 3 developed a haemolysin, or more haemolysin and more agglutinin, as a result of the first transfusion.

It has been noted by several observers that, as in Case 3, haemolysis following transfusion may be a much more violent phenomenon than haemolysis of the same blood *in vitro*, and even a slight degree of agglutination of the proposed donor's corpuscles should be viewed with suspicion, for the danger is not one to be lightly regarded. Bernheim,<sup>12</sup> collecting 800 reported cases of transfusion, found 15 instances of macroscopic haemolysis. Among these there were four deaths, three in cases in which no preliminary tests had been made and one in which it had been found that the donor's cells were slightly agglutinated by the patient's serum. There can be no doubt that a much higher proportion of disasters would have occurred but for the safeguard of preliminary tests.

Moss<sup>7</sup> showed that antihaemolysins are always present in blood the red cells of which are haemolysed by the serum of another individual. The presence of the antihaemolysin and the dilution of the transfused blood by the blood of the recipient probably explain the fact that it is less dangerous to introduce a blood containing haemolysins for the patient's corpuscles than to introduce one of which the red cells are destroyed by the patient's serum.

I know of no immediate phenomena resulting from the introduction of cells which are agglutinated without being haemolysed by the recipient, nor, indeed, is it known whether iso-agglutination occurs in the circulation. On one occasion, in the absence of a more suitable donor, I gave a patient 100 c.c. of blood the red cells of which he agglutinated. He was not benefited, but, on the other hand, he exhibited no unfavourable reaction. Nevertheless, it is undesirable to run risks by employing a donor belonging to a different group to the patient except in cases of extreme urgency, and then the risk will be least if the donor belongs to Group IV., so that his own cells cannot be agglutinated or haemolysed. Or if, in such cases, the grouping of the bloods of both donor and recipient is unknown and testing is impracticable, a small preliminary transfusion should be done half an hour before the main mass of blood is transferred, so that gross incompatibility may be recognised in time.

#### *Reactions following Transfusion of "Compatible" Blood.*

Even in those cases in which both donor and recipient have been found to belong to the same group febrile reactions are apt to follow transfusion. Among my own cases rigors have occurred in about 10 per cent., fever in about 25 per cent., and these figures agree closely with those published by most observers. The rigors have followed within half an hour of the transfusion, and the temperature in the febrile reactions, apart from the sudden rise accompanying the rigor, has usually reached a maximum of 102° to 103° F. on the following day, subsiding within 48 hours.

It has been suggested that the fever is due to incipient coagulative changes in the transfused blood, and some support is lent to this view by the fact that rigors are common after intravenous injection of defibrinated blood. Moss<sup>13</sup> noted rigors and transient fever in the majority of 75 cases which he treated by this method without other untoward results. But I have noticed a minute trace of coagulum remaining in my apparatus after transfusion on several occasions, although no reaction followed in the patient; and Lindeman,<sup>14</sup> in a series of 108 transfusions, observed that febrile reactions with or without rigors occurred much less commonly when the donor was a relative of the patient than when he was an "alien," and this although incompatibility due to agglutination or haemolysis had been ruled out in every case.

In some of my cases in which the patient has been transfused twice from the same donor a febrile reaction has followed the first transfusion but not the second; in other cases no reaction followed on the first occasion, while the second was succeeded by fever. But only in one case have the symptoms been at all alarming.

CASE 4.—The patient, aged 38 years, suffering from pernicious anaemia, was admitted to St. Bartholomew's Hospital under the care of Dr. Morley Fletcher. During a previous admission I had twice transfused him from his brother with marked benefit, the red cells rising from 500,000 to 3,800,000 per c.mm. and the haemoglobin from 16 to 86 per cent. during the course of seven weeks. He was now transfused with

275 c.c. from another donor, who had made a long journey for the purpose and whose blood had been found to be compatible a week previously. Within 15 minutes of the completion of the operation the patient had a rigor and his temperature rose steadily until it reached 105° F. three hours later. He became delirious and on the day following the operation the yellow colour of his skin was much deeper than before, but the blood serum showed no trace of haemoglobin. The most alarming symptom, however, was complete anuria, which lasted for 43 hours after the transfusion. The urine passed subsequently contained an excessive amount of urobilin, but not an unusual amount for a case of pernicious anaemia. The temperature fell slowly, reaching normal three days after the transfusion. But the subsequent rise in the number of red cells and the amount of haemoglobin was slight and transient, and the patient is about to be transfused again. Unfortunately, owing to the remoteness of the donor, I have been unable to repeat the agglutination tests in this case.

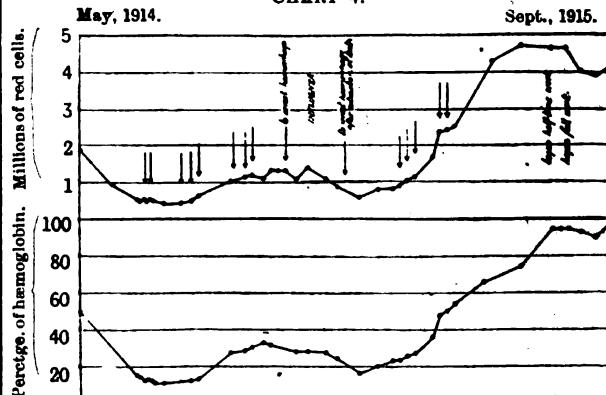
There are thus certain reactive phenomena which we cannot at present avoid, although the frequency of their occurrence is said to be diminished by the choice of close relatives of the patient as donors. The chief dangers may be eliminated by careful testing for agglutinins and haemolysins, but it may prove desirable to investigate other factors of which we as yet know nothing, not merely for the sake of avoiding accidents, but also to determine whether a given donor is likely to afford the maximum benefit in a particular case.

#### *Dosage.*

The amount of blood to be transfused depends upon the purpose of the transfusion, and in cases in which a considerable transfusion is proposed without the immediate object of increasing the red cell content of the blood it may be advisable to bleed the patient before the operation in order to avoid overloading the circulation.

For the arrest of spontaneous haemorrhage small doses of blood, even 20 c.c., will sometimes suffice, whereas in the treatment of acute anaemia due to haemorrhage the blood lost should be replaced as fully as possible, with due regard to the danger of dilating an enfeebled heart. But great uncertainty exists as to the optimum dosage in the treatment of chronic anaemias. There is a tendency now to the belief that large single transfusions are less beneficial, so far at least as stimulation of the bone marrow is concerned, than are small or moderate repeated transfusions, and I notice that the results which I have obtained in cases of pernicious anaemia with 250 c.c. doses compare favourably, even after a single transfusion, with those reported in America after such massive doses as 1000 c.c. or more. Careful and prolonged trial of different doses administered at various intervals is necessary before more can be said as to the best routine to employ, but the following case is interesting as illustrating the apparent value of very small doses.

CHART 4.



At each of the points indicated by an arrow the patient received 20 c.c. of blood. (The notes on the chart read from left to right: (1) to arrest hemorrhage; (2) influenza; (3) to arrest hemorrhage after extraction of teeth; (4) began half-time work; (5) began full work.)

CASE 5.—The patient, aged 38 years, was admitted to the Metropolitan Hospital on May 14th, 1914, under the care of Dr. Langdon Brown, suffering from haemorrhage from the nose and gums, extensive purpura, spontaneous bruising, and haematuria. No cause for the disease could be

discovered. The symptoms were of sudden onset, and the epistaxis and bleeding from the gums persisted steadily after admission in spite of treatment. After two months the patient's blood was reduced to under 500,000 red cells per c.mm. and 12 per cent. haemoglobin. At this stage small injections of normal blood were commenced, 20 c.c. being administered by syringe at intervals, as shown on the chart. The course of the anaemia will be seen. Progress was interrupted by a recurrence of spontaneous haemorrhage, by an attack of influenza, and by a profuse haemorrhage after extraction of several teeth, but a year later the patient returned to work with a red cell count of 4,700,000 per c.mm. and 95 per cent. haemoglobin. He has remained at work ever since and his general health is good, but the blood, although it contains 100 per cent. of haemoglobin, shows at present only 3,500,000 red cells per c.mm.

#### *Methods of Transfusion.*

The first consideration is to prevent coagulation of the transfused blood, the second to determine the amount which passes from donor to patient. The methods which have been employed may be classified as follows:—

I. Direct. By anastomosis of vessels, with or without a cannula.

II. Indirect. (i.) By syringe: (a) syringe transferred from needle in vein of donor to needle in vein of recipient; (b) syringe with two-way tap leading to veins of donor and recipient. (ii.) By use of a receiver: (a) with paraffin lining; (b) with addition of an anti-coagulant.

I have not attempted vascular anastomosis. The method is advantageous in avoiding exposure of the transfused blood, but it requires great surgical skill and the damage done to the blood-vessels employed is a serious drawback so far as the donor is concerned, while it may prove disadvantageous to the patient if the operation has to be several times repeated. And, further, no exact determination of the amount of blood transfused is possible.

The syringe method, popularised by Lindeman, requires two skilled operators, several other assistants, and a large number of expensive syringes which are easily broken. But given these various requirements the method is a good one. The mechanical difficulties in connexion with the two-way tap are very great. I have had several taps made, but finally discarded them in favour of a method employing a receiver. The paraffin-lined apparatus of Satterlee and Hooker<sup>15</sup> requires elaborate precautions, and coagulation is very liable to occur, whereas the use of an anti-coagulant renders transfusion a simple matter. Satterlee and Hooker<sup>16</sup> have employed hirudin to prevent coagulation with satisfactory results, but it is difficult to guarantee the absence of toxic substances in the hirudin, and serious symptoms have occurred in some of the later cases in which it has been employed.

Two years ago Weil<sup>17</sup> published his experiments on the transfusion of exsanguinated animals with citrated blood, and since then I have employed sodium citrate in 29 transfusions. At the same time it has been very extensively used in America and its convenience is generally recognised, although some workers assert that it has a toxic action when used in adequate doses. All the clinical as well as the experimental evidence is opposed to this assertion. Weil recommended a 10 per cent. solution of the citrate, which is sufficiently nearly isotonic with the blood to avoid causing haemolysis, and one part of this almost always prevents coagulation when mixed with 10 parts of blood. Smaller quantities of citrate will often suffice, but the higher proportion has, so far as I can determine, no disadvantages. Salant and Wise<sup>18</sup> have shown that the toxic dose of sodium citrate in dogs and cats is far greater than this, and Weil states that the coagulation-time of the recipient is actually lowered by transfusion of citrated blood. It may be questioned whether the citrate, by merely inhibiting the final stage in the process of coagulation, masks the preliminary stages which have in themselves rendered the blood toxic, but even if this is so, the dangers involved are not great and the value of the transfused blood is not evidently diminished.

The apparatus which I employ sucks the blood from the vein of the donor into a glass receiver, while a graduated stream of 10 per cent. solution of sodium citrate mingles with the blood as close as possible to its exit from the vein. When the required amount of blood has been withdrawn suction is stopped, the stream of citrate solution is cut off, the needle is removed from the vein of the donor and introduced into the vein of the patient, and the blood is gently

pumped from the receiver. By this method the time employed in withdrawing and transferring 250 c.c. of blood is usually about 15 minutes.

#### *Summary.*

1. Transfusion has been successfully employed in the treatment of various kinds of anaemia and in the arrest of spontaneous haemorrhage. It has also yielded promising results in cases of serious infection and in certain toxæmias.

2. The ultimate prognosis in cases of anaemia depends upon the power of reaction in the bone marrow, and this can only be adequately determined by observing the results of treatment.

3. In cases of pernicious anaemia both increased red-cell production and diminished red-cell destruction may result from transfusion.

4. In cases of pernicious anaemia the age of the patient, the duration of the disease, and the condition of the bone marrow as indicated in the peripheral blood have hitherto proved to be the best guides to the progress subsequent to transfusion.

5. The optimum dosage for transfusion is not yet determined, but it is probable that moderate repeated doses are preferable to large single doses in the treatment of chronic anaemias. Very small doses may sometimes be of value.

6. The donor should be a healthy adult with negative Wassermann reaction. The serum of the donor should not agglutinate the corpuscles of the patient, and the serum of the patient should not agglutinate the corpuscles of the donor. Agglutinins should be excluded by tests done immediately before the transfusion, and a single examination is not sufficient to establish the compatibility of two bloods on all future occasions. If agglutinins are absent, haemolysins will also be absent.

7. If there be great urgency and testing of the blood of patient and donor be impracticable, a small preliminary transfusion should be done half an hour before the main mass of blood is transfused, so that gross incompatibility may be recognised in time.

8. Febrile reactions occur after about 25 per cent. of transfusions, even though the bloods of donor and patient have been proved to be "compatible." Rigors occur in about 10 per cent. of the cases.

9. It may prove desirable to investigate the blood of donor and patient with regard to factors of which we as yet know nothing, not merely for the sake of avoiding accidents, but also to determine whether a given donor is likely to afford the maximum of benefit in a particular case.

10. The indirect method of transfusion, employing a glass receiver and sufficient sodium citrate to prevent coagulation of the transfused blood, is simple and involves no special dangers.

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**THE SWEDISH ROYAL ACADEMY OF SCIENCE.**—Sir William Crookes, O.M., F.R.S., has been elected an Honorary Foreign Member of this Academy.

**ALEXANDRA NURSES AND MATERNITY HOME, DEVONPORT.**—The annual meeting of the supporters of this institution, which is in connexion with the Soldiers' and Sailors' Families Association, Devonport, was recently held under the presidency of Mrs. F. B. Mildmay; there was a large gathering. The report stated that during 1916 the number of babies born in the home was 153, against 96 in 1915. In addition, the nurses had attended 620 midwifery cases and 417 general cases. Rear-Admiral J. de M. Hutchison appealed for subscriptions from friends of the Royal Navy. The financial statement was satisfactory.

## THE TECHNIQUE OF THE PREPARATION OF CULTURE MEDIA CONTAINING ALBUMINOUS FLUIDS, IN PARTICULAR FOR THE GROWTH OF THE MENINGOCOCCUS.

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THE great advantage of the addition of albuminous fluids to media for furthering bacterial growth is, of course, well known, but the serious objection to their routine use has been the difficulty in sterilising them without altering their physical or nutritive properties. The alternative of collecting them in a sterile manner may be applied to blood or serum in small quantities from man or with special facilities in large quantities from large animals, but in the case of ascitic fluid the collection of a sterile specimen is notoriously difficult.

It may be assumed that the activity displayed in the past two years in the production of media for the growth of the meningococcus has some relation to the difficulty in obtaining sterile body fluids in large quantities, since it has long been known that blood agar, serum agar, and various preparations of ascitic fluid are more or less satisfactory for the growth of this organism.

When first interested in the preparation of sterile serum an attempt was made to reinforce the action of a volatile antiseptic by the application of slight heat. Dr. L. Rajchman and I thus published a note upon ether associated with mild heat, as suggested by Ori. In our method 3 per cent. of ether was added to the serum and the whole enclosed in a tightly stoppered bottle, which was placed in a water-bath for one hour at 45° C. and then 24 hours at 37° C.

By means of this method large quantities of serum agar have been prepared. It has, however, certain disadvantages. Sometimes a batch of serum is found not to have been sterilised, and when such refractory bacteria are present it is necessary to continue the heating in the incubator for days or weeks. Again, all bacteria are not inhibited by the ether in the cold, and some may grow in the bottles stored in the cupboard if they have been contaminated during any manipulation. For these reasons I tried the effect of chloroform in place of ether.

Chloroform has been used in the preservation of sterile serum for years and also in the sterilisation of such materials. In my hands, however, for the latter purpose it had proved unsatisfactory. If sterilisation was to be successful, it required at least months to effect. It, however, seemed probable that the application of slight heat which was insufficient to alter the delicate proteids even of whole blood might nevertheless greatly increase the bactericidal action of chloroform. A trial was therefore made with 0·5 per cent. chloroform upon some contaminated serum in a tightly stoppered bottle at 45° C. One hour at this temperature in a water-bath was found to sterilise it completely without in any way altering its appearance.

Chloroform has now been in use for 12 months, and during this time all serum and ascitic fluid have been sterilised with it. It has also been adopted for sterilising and preserving haemolytic and agglutinating sera. In view, however, of certain criticisms which the publication of the ether technique called forth, it may be desirable to mention that chloroform is only suggested as a *practical* method for preparing sterile serum for media. If serum is grossly contaminated with spores, it cannot be sterilised in one hour at 45° C. Slaughter-house blood is, however, not grossly contaminated with spores.

*The sterilisation of serum.*—The serum should be collected at a slaughter-house. The best animal to use is, of course, the horse, owing to the rapidity with which the corpuscles deposit, but for some time no horses have been available, and we have used ox blood. Unfortunately it is almost impossible to withdraw the serum from ox blood without the bulk of it being more or less heavily contaminated with corpuscles. We do not now attempt to get the serum absolutely free from corpuscles, but collect the whole as clear as possible and allow it to stand in the ice-chest in tall sterile jars about 2 in. in diameter. An efficient ice-chest

must be used for this purpose, because it may be necessary for the serum to stand as long as 14 days before complete deposition has taken place.

The jars should be examined after five days, when the corpuscles will be about half deposited. The clear serum should now be removed with a pipette or slowly syphoned off. Great care must be exercised in order not to disturb the corpuscles.

The separated serum is now distributed in measured quantities (200 c.c.) into glass-stoppered bottles (the fit of the stopper must be perfect) or into larger glass bottles. If the bottles of serum are to be disturbed, for instance in transit, it is better to fill them for despatch from a large bottle, otherwise on arrival they will be found to be "muddy" from the shaking up of a slight deposit caused by excess of chloroform in the bottle. Chloroform is added to each bottle to make 0·5 per cent. A drop of sterile oil is next applied to the stopper to prevent sticking and a dust-cover is fastened tightly over it.

The bottles are placed in the water-bath at 45° C. for one hour, being shaken occasionally. When they have cooled, a sample may be removed and mixed with agar to test sterility. This tube should be incubated for at least 5 days before sterility is assumed. We have not yet met with a sample of serum which was not sterile after undergoing this process, and it is recommended as a quick and certain method. It does not, however, leave the serum always unchanged; if the serum is red from admixture of lakèd corpuscles the colour tends to turn brown and darken. When the serum is required for any purpose entirely unaffected by heat, sterility may be obtained readily by placing the bottles in the air incubator at 37° C. and shaking occasionally. After 24 hours they will in most cases be found to be sterile, and almost invariably after 2 days.

When sterilised the bottles of serum are stored in a cupboard. Before the material can be used as a medium the chloroform must be removed, and unless this is done correctly the removal may not be efficient. The best way is to pipette the serum off in measured quantities (50 c.c.) into 200 c.c. flasks, and then to heat these flasks up to 55° C. rapidly and place them under the receiver of a pump. When a partial vacuum has been obtained, the receiver containing the flasks is shaken and the chloroform then boils off. If an exhaust pump is not available the flasks may merely be heated to 55° C. and thoroughly shaken. This, of course, will often soil the wool plug, but will not necessarily lead to bacterial contamination if non-absorbent wool is used. The serum is now ready to incorporate into a culture medium.

The chloroformed serum stored in bulk is very easy to handle and is not susceptible to contamination during the removal of samples. It is absolutely clear, but often a slight deposit collects upon the bottom of the bottle; this deposit is, however, compact and is not disturbed during the process of pipetting.

*The sterilisation of ascitic fluid.*—The ascitic fluid is collected from the patient into a large glass bottle and this is allowed to stand in the ice-chest for a day or two to permit the formation of any clot or gross deposit. The fluid is then decanted or filtered through glass wool. Ascitic fluid varies considerably in its reaction to litmus and thus should be brought to a slightly alkaline or neutral reaction with acid or alkali. The fluid is then distributed into stoppered bottles and chloroformed, the further treatment being exactly the same as for serum.

Ascitic fluid is always more susceptible to the formation of flocculent deposits during sterilisation than serum and these deposits are more easily disturbed during the removal of samples.

*The sterilisation of blood.*—Blood is collected at the slaughter-house in the same manner as serum, but instead of being allowed to clot it is defibrinated by stirring with a large wooden stick wrapped in gauze, the whole being previously sterilised.

In order to sterilise blood by the heat-chloroform method it is necessary to lake it before adding the chloroform. It is found that the bactericidal action of chloroform is quite inhibited when the fluid contains matter in suspension, and thus even 1 per cent. chloroform will not sterilise unlaked blood. For laking we have used both ether and distilled water and have found the latter preferable. An equal part of distilled water is added to the blood and the mixture distributed as in the case of serum. 0·5 per cent. chloroform is then added and the bottles well shaken.

While serum and ascitic fluid may be sterilised at 45° C., this temperature is not permissible in the case of blood, since a heavy precipitate forms after about 30 minutes. The bottles are therefore placed in the air incubator at 37° C. and constantly shaken. After 24 hours a sample is taken to test for sterility, and pending the result the bottles are not returned to the incubator, because the longer blood is heated the darker does the colour become. From the point of view of transparency in the subsequent medium the red colour of the blood should be retained as much as possible. Twenty-four hours is invariably long

enough to ensure sterility, the blood itself being practically sterile at the beginning.

This sterile blood is much more susceptible to the action of heat than serum; when, therefore, it is subsequently mixed with agar care must be taken that it is not heated above 55°C. and for as short a time as possible.

*The method of preparing media with sterile albuminous fluids.*—The media to which this method has been applied mostly are as follows:—

1. *Ascitic agar.*—Ordinary lemcō- (or meat-) peptone agar is prepared containing 2½–3 per cent. of agar. It is measured into 200 c.c. flasks in quantities of 150 c.c. and autoclaved. When required for use a flask of agar is melted in the steamer and treated in one of two ways:—

(a) It is poured into a sterile distributor maintained in a water-bath at 50°C. and a flask of ascitic fluid (50 c.c.) is added. The contents are mixed and then "tubed" through a "hooded" pipette to avoid contaminations.

(b) The flask of ascitic fluid may be poured directly into the melted agar in its flask and mixed and then rapidly poured either into Petri dishes or tubes. This latter method has the advantage of reducing the heating of the medium to a minimum, but requires more care.

It is important to mix the agar with the ascitic fluid (or serum) at a temperature as low as possible, since this results in a more transparent medium. This ascitic agar is as clear as ordinary agar, and has been found to grow the meningococcus admirably from the throat. Our samples have all contained blood, and this, together with nasal mucus, probably accounts for the excellence of the growth. In subculture this medium does not produce growths so profuse as serum agar.

2. *Serum agar.*—This medium is prepared in exactly the same way as ascitic agar, using serum. It also is no more opaque than ordinary agar. The meningococcus grows upon this medium in the great majority of cases, but sometimes inexplicably fails.

3. *Blood agar.*—An excellent transparent blood agar may be prepared by adding 25 per cent. of the sterile laked blood to 2½–3 per cent. agar. The finished medium thus contains 12·5 per cent. of blood.

4. *Blood-serum agar.*—This is the medium which we use for all routine work with the meningococcus except the primary cultures from throats. It contains a small quantity of laked blood, sufficient to stimulate growth but hardly sufficient to make any difference to the colour. We use 1 part of blood in 400 of medium, 1 c.c. of the laked blood (diluted 1 in 2) being added to each 50 c.c. flask of serum, or the blood may be added in bulk to the bottle of serum before this is distributed into flasks. In order to reduce the colour we use neither lemcō nor meat in the preparation of the agar, merely salt solution and peptone (Morson's).

The growth of the meningococcus upon this medium is profuse and one "slope" is sufficient to supply emulsion for carrying out, for instance, a set of agglutination tests with five different sera. Other delicate pathogenic organisms, such as pneumococci and streptococci, also develop abnormally large colonies upon it.

#### A CASE OF

### SHELL-WOUND OF THE HEART CAUSING COMPLETE HEART-BLOCK.

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LATE CAPTAIN, R.A.M.C.; HONORARY PHYSICIAN, ANCOATS HOSPITAL,  
MANCHESTER.

I AM indebted to Captain J. Morley, R.A.M.C. (T.), for the opportunity of seeing and recording this unique case, which presents problems alike in regard to causation and treatment.

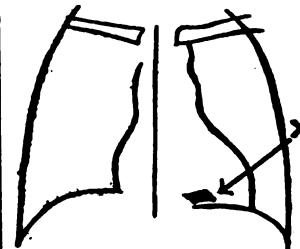
The patient, a soldier, aged about 20, received a wound over the heart region on July 1st, 1916, probably by a portion of shrapnel. I saw him first in December, 1916. The wound had completely healed, but there was some shortness of breath on exertion. He never had any syncope attacks of any kind; nor had he any pain. The heart's dullness was increased to the left and probably to the right. There was a soft systolic murmur over the apex. The rhythm was regular; the rate slow, 40 per minute. This did not vary with effort. Previous X-ray examinations had shown the presence of the fragment in the immediate vicinity of the heart, and he was admitted with a view to considering the possibility of operation for its removal. A screen examination which I made showed that the fragment was in the position shown in Fig. 1. It distinctly moved in an upward direction with the ventricle at each systole. It was probably in the myocardium or in the substance of the pericardium, which was probably adherent over this site. The heart, too, appeared much

larger than had been suspected from percussion. Immediately after the screen examination an electro-cardiographic curve was gained (Fig. 2), typical of complete heart-block. The auricles (rate 96) are beating quite independently of the ventricles (rate 40).

The notes are, unfortunately, very brief, owing to the exigencies of military conditions, and the patient was only under my personal observation for a few days; nor have I been able to get any notes either previous or subsequent to this occasion. He has been lost sight of entirely.

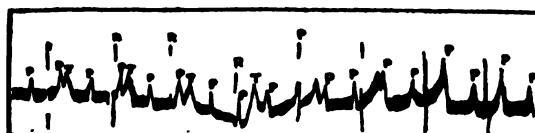
Two problems are presented in this case: What is the relation of the wound to the blocking, and secondly, what treatment could be advised? As regards the first, there seems little reason to doubt that the heart-block was induced by causes immediately associated with the wound. He had up to the date of its reception been perfectly well, and so slow a pulse previous to this occasion would not have passed unnoticed. It is, we think, anatomically impossible for the bundle of His to have been directly damaged by the fragment, situated as it is in the very centre of the heart, whereas the fragment is on the outer aspect of the myocardium and nearer the apex than the base of the heart. The only explanation we can suggest is that the mechanical shock to the heart due to the wound caused at the same time a small haemorrhage which implicated the auriculo-ventricular

FIG. 1.



Diagrammatic, to indicate roughly the site of the fragment (x) situated near the diaphragm on the left side. It moves synchronously with the heart at each systole.

FIG. 2.



Electrocardiographic curve showing typical complete heart-block.  
P = auricular systole; R T = ventricular systole.

bundle. It is a structure with a fairly good blood-supply, and it is embedded in tissues of some rigidity, which would offer, therefore, a relatively greater resistance to a mechanical blow.

As to treatment, medical measures are obviously of little avail. Atropine had no effect in relieving the block, and if one is right in considering the cause as traumatic, drugs such as potassium iodide could offer no satisfactory prospects. Operation would be equally helpless in removing the block. That in an ordinary case the fragment could be successfully removed we have little doubt; the war has shown this. But would a surgeon like to operate upon a case complicated, as this is, by a severe functional disorder? Though hitherto this patient had had no syncopal attacks, it by no means follows that such an event might not be induced under an anaesthetic. But here we have no experience to guide us; we have noted, however, that the intravenous injection of salvarsan, a relatively trivial affair, has been followed by rather startling symptoms in the few occasions in which it has been tried in cases of heart-block. And even were the fragment removed, it is doubtful whether the full functional efficiency of the myocardium, already seriously impaired as shown by the dyspnoea and the cardiac enlargement (neither condition necessarily associated with pure heart-block), would be restored or much alleviated.

Manchester.

**SOUTH DEVON AND EAST CORNWALL HOSPITAL, PLYMOUTH.**—The report read at the annual meeting, recently held under the presidency of Viscount Clifden, stated that during 1916 1672 in-patients and 1793 out-patients had been treated. The treasurer reported a year of "unprecedented financial anxiety," as the ordinary expenditure for the year exceeded the ordinary income by £3190, and the committee appealed for increased subscriptions so that the work of the hospital might not have to be curtailed for want of funds.

## METABOLISM IN GOUT.

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Two early and important discoveries focussed the attention of the profession on the problem of the exact relationship of uric acid to gout. In the first place, Wollaston showed that a salt of uric acid was deposited in the tissues of many gouty patients; and, secondly, Garrod demonstrated that an increase of uric acid commonly occurred in the blood of such subjects. The issue raised was, and is, whether uric acid is the essential cause of the disease or merely an agent incidental to its pathology. An immense amount of work has been done to clear up the point, and although the effect of this and allied investigations has been to modify some current theories and to falsify others, no decision has yet been reached: the pathology of gout still remains hypothetical as regards its causative factor. Under these conditions further research on the beaten track seemed desirable, and this consideration led me to investigate the calcium metabolism in gout. It is well known that calcium is a regular ingredient of gouty deposits, and in some analyses of tophi I found that the murexide test failed to reveal the presence of uric acid. Before describing the methods, conditions, and results of the investigation it is advisable to state briefly what is known regarding the excretion of calcium in health and in some diseases.

## General Considerations.

Calcium is taken into the organism in both inorganic and organic form. Its principal inorganic salts in food are the phosphate, sulphate, and carbonate. Organic combinations are believed to occur in milk, eggs, and vegetables. The absorption of calcium largely depends on the salts present; thus associated sodium chloride raises the absorption of calcium, and the latter is also affected by the phosphorus intake, because the formation of insoluble calcium phosphate may retard absorption. The precise needs of the human organism relative to calcium are still undetermined. H. Oberndorffer<sup>1</sup> puts the figure at 1.5 grammes per diem, whereas Bunge<sup>2</sup> gives 3.5 grammes as the required daily quantity. It is probably safe to say that a diet containing less than 1 gramme of calcium oxide per day is deficient in calcium. Widely different statements are made as to the calcium content of the blood under normal conditions. Bunge<sup>3</sup> puts it at 0.04 per cent. of calcium oxide, but others give figures as high as 0.27 per cent. No doubt the content is related to the amount in the diet, and doubtless the same is true in pathological conditions; Hirschler and V. Terray<sup>4</sup> found in a case of chronic endo-arteritis on a mixed diet 0.0051 per cent. of calcium oxide in the blood, which sank on a milk diet to 0.0027 per cent.

Of the total intake by far the greater part is voided with the faeces, only about 10 per cent. being excreted in the urine (Sherman).<sup>5</sup> In Vierordt's Tabellen (p. 237) the daily output of calcium oxide in the urine is given as 0.2 to 0.3 gramme. This is the average of several analyses. In osteomalacia there is a pronounced loss of calcium, and there is more calcium in the urine than in the faeces. On the other hand, in osteitis deformans a marked retention of calcium in the body occurs, and the proportion excreted in the urine is greatly diminished.<sup>6</sup> In wasting diseases the urinary calcium rises. It has been shown experimentally that the administration of soluble calcium salts, or of acids (such as lactic) which yield soluble calcium salts, increases calcium excretion via the kidneys.

Previous studies of metabolism in gout do not appear to have touched upon calcium as a factor, but, as already stated, have been mainly concerned with uric acid; and in relation to this substance Garrod's observation that there is an increase in the blood has been corroborated by other workers. Gudzent<sup>7</sup> found that the blood may contain as much sodium mono-urate as, or more than, it can hold in solution (8.3 mg. per 100 c.c. of blood), so that there is

a relatively supersaturated solution of the lactim form of urate; even on purine-free diets gouty blood contains an excess of uric acid independently of acute attacks. This conclusion has been confirmed since the introduction of Folin's<sup>8</sup> new method of estimating uric acid.

Irregular periods of nitrogen retention and loss are quite frequent features in gout. The cause of the variations is uncertain, although it is probable that the major part is accounted for by purine retention; most of the excessive loss occurs during acute attacks (Brugsch<sup>9</sup>). The statements respecting phosphorus metabolism in gout are varied and contradictory, but there does not appear to be any pronounced variation from the normal. In view of the ascertained fact that the calcium coefficient, particularly in respect of the urine, depends on the intake, it was essential during observations to prescribe a fixed diet of known composition.

## Present Observations.

The following, briefly, are the methods employed in my analyses of urine, faeces, and foodstuffs. Phosphorus was estimated by Neumann's method; moisture by drying at 100° C. and weighing to constant weight; uric acid by the method of Folin and Shaffer; calcium by Aron's method; and total nitrogen by Kjeldahl's method. These are standard methods, and do not therefore need description. It should be added that Aron's method<sup>10</sup> for calcium was found quite trustworthy when applied to foodstuffs, blood, and faeces, but in the case of urine gave results which were too high. Professor Spiro kindly informed me, on inquiry, that he had found the method inaccurate in the analysis of the urine because of the large amount of alkali sulphates thrown out of solution on the addition of alcohol and weighed with the calcium sulphate. He said he had modified the method as follows: Take 500 c.c. of urine, evaporate down to 150 c.c. and then add ammonia and ammonium oxalate sufficient to precipitate all the calcium present. Allow the vessel to stand one or two hours and decant the fluid through a folded filter. Return the filter to the flask and oxidise by Neumann's method. After this process quantitatively transfer it to a beaker and precipitate the calcium sulphate with three to four volumes of 40 per cent. alcohol. The precipitate is washed, dried, and finally weighed in a Gooch crucible. This is the method I adopted for the urine, except that 95 per cent. alcohol was used, as it was found that in 40 per cent. strength it was insufficient to cause complete precipitation.

## Diet.

The two cases investigated were in hospital simultaneously and received the same diet, the following being the daily regimen: Bread, 395 gms.; butter, 55 gms.; sugar, 30 gms.; oatmeal porridge, 298 gms. (weighed after cooking 55 gms. of Quaker oats); meat (beef), 100 gms., weighed after cooking; potatoes, 260 gms. weighed after cooking; milk, 1 litre; Salutaris water, 500 c.c. (calcium-free). The porridge was made with 400 c.c. water; 600 c.c. of water were also taken in the form of weak tea. The following figures summarise the analyses for nitrogen, phosphorus, and calcium in the diet. Each is the mean of two or more analyses:

	Nitrogen.		Phosphorus.		Calcium.	
	Per cent.	Gms. in daily food	Per cent.	Gms. in daily food	Per cent.	Gms. in daily food
Bread ... ...	1.15	4.58	0.16	0.64	0.017	0.08
Milk ... ...	0.5	5.0	0.027	0.27	0.16	1.6
Butter ... ...	0.14	0.07	0	0	0	0
Meat ... ...	3.72	3.72	0.42	0.42	0.024	0.024
Potatoes* ...	0.30	0.78	0.09	0.24	—	—
Oatmeal ...	0.29	0.86	0.20	0.60	0.087	0.25

\* No estimation of calcium in potatoes was made. Bunge in his tables (*Physiol. d. Menschen*, II, 88) states that 1000 gms. of potatoes contain 1 gramme of calcium oxide.

## Clinical Data.

Before going on to consider the composition of the urine and faeces, it will be convenient to describe briefly the clinical condition of the two patients.

<sup>1</sup> Berlin. klin. Wochenschrift, 1904, No. 41.

<sup>2</sup> Zeitsch. f. Biol., XII, 1901; XIV, 1904.

<sup>3</sup> Ibid., XII, 1876.

<sup>4</sup> Zeit-ch. f. klin. Med., VIII, 1906.

<sup>5</sup> Chemistry of Food Nutrition, 286, 1st edition.

<sup>6</sup> J. C. DaCosta and others: Publications from the Jefferson Medical College, Philadelphia, vi, 1, 1915.

<sup>7</sup> Zeitsch. f. Physiol. Chem., LXIII, 455, 1909.

<sup>8</sup> Folin and Denis: Journ. Biol. Chem., XIII, 469, 1913.

<sup>9</sup> Zeitsch. Expt. Path. Ther., 1906, 619.

<sup>10</sup> Biochem. Zeit-ch., IV, 268, 1907.

**CASE 1.**—The patient, a man aged 49, had suffered from gout for 22 years, first in the big toe and subsequently in many other joints, and had tophi in the ears and fingers. He used to take a large amount of cheap beer, and to eat a lot of meat. He was subject to attacks about once a month, and his last attack, in the big toe, had begun five days before admission. His systolic blood pressure was 210 mm. Hg; the specific gravity of the urine was 1015; there was a small amount of albumin present in the latter and also a few casts. There was no cardiac murmur. He had no acute attack during his stay in hospital and was free from pain.

**CASE 2.**—The patient, a man aged 40, suffered from a first attack of gout in a big toe about 12 years previously and had had frequent attacks thereafter, with the pain flitting from joint to joint. The existing attack began about two months before admission. The various attacks had affected nearly all the joints with the exception of the shoulders. Subsequent to admission two joints, the left big toe and left wrist, had been affected. No cardiac murmurs, no albuminuria, small tophi in ears; systolic blood pressure 160 mm. Hg.

**Excretions.**—Both of the above patients were under observation from Feb. 17th to March 9th. From Feb. 24th to March 3rd (eight days) they received no calcium except what was in the food; from March 4th to 6th (three days) they took extra calcium in the form of calcium chloride equivalent in terms of calcium oxide to 0.735 gm. in the 24 hours. The urine and faeces were analysed each day, and the following table gives the daily averages of the two periods (A) without and (B) with the calcium chloride addition.

TABLE I.

	Nitrogen in gms.				Phosphorus in gms.				Calcium as CaO in gms.				
	Food.	Food.	Urine.	Faeces.	Food.	Food.	Urine.	Faeces.	Food.	Food.	Urine.	Faeces.	Balance
Case 1 { A	14.9	15.1	2.5	-2.7	2.1	2.1	1.1	0.9	+0.1	2.0	0.13	2.3	-0.4
	15.0	11.7	1.4	+1.9	2.1	2.1	1.07	0.5	+0.4	2.73	0.14	1.47	+1.1
Case 2 { A	14.9	10.7	1.6	+2.6	2.1	2.1	1.04	0.34	+0.72	2.0	0.14	1.3	+0.8
	15.0	7.4	1.5	+6.1	2.1	2.1	0.86	0.4	+0.84	2.73	0.11	2.14	+0.4

A sample of blood was taken from the two patients the day before they left the hospital and analysed. In Case 1 the blood calcium content was 0.071 per cent. calcium oxide; in Case 2 it was 0.062. From these figures it will be seen that the administration of calcium chloride was accompanied by a retention of nitrogen; there was little or no change in phosphorus metabolism, and with regard to the calcium it led in the first case to retention of that element, and in the second the retention which occurred previously to taking the calcium salt was diminished. The change, however, in either direction was not large, and the calcium content of the urine remained unaltered in both cases. The result, however, which most interested me was the effect upon uric acid excretion in the urine, shown in Tables II. and III.

TABLE II.—Uric Acid Excretion in Grammes.

Case 1.

Case 2.

Before adminis- stration of calcium chloride.	During adminis- stration of calcium chloride.	Before adminis- stration of calcium chloride.	During adminis- stration of calcium chloride.
0.64	0.43	0.31	0.17
0.65	0.32	0.24	0.13
0.66	0.36	0.23	0.12
0.62		0.31	
0.42		0.28	
0.55		0.16	
0.54			
Mean 0.61	Mean 0.37	Mean 0.28	Mean 0.14

It will be observed that there is a marked decrease in the uric acid output during the administration of calcium. In two other somewhat similar cases (long-continued gout with fairly frequent acute attacks), taking the same fixed diet, I found a like effect upon the uric acid output produced by

the administration of calcium chloride (10 grains three times a day).

TABLE III.—Uric Acid in Grammes.

	Case 3.	Case 4.
Before giving $\text{CaCl}_2$ (5 days)	0.12	0.062
During administration of $\text{CaCl}_2$ (4 days)	0.10	0.012
After administration of $\text{CaCl}_2$ (2 days)	0.15	0.083
During administration of atophan (3 days)	0.33	0.188
After administration of atophan (1 day)	0.17	0.093

I am unable to offer any explanation of this effect of a soluble calcium salt upon the uric acid output. It can scarcely be regarded as beneficial, although in only one of the four cases was it accompanied by any return of joint pains. My opinion, based upon clinical observation, is that the lime salts tend to aggravate gouty manifestations, and that a restriction of the foodstuffs containing more than moderate quantities of calcium is advisable, especially in tophaceous gout. I have added in the foregoing table the effect of atophan on the excretion of uric acid in these two cases. This drug produced the usual increase in the uric acid output. There are, however, exceptions to this rule. In my private practice a case occurred where the excretion of uric acid was markedly diminished on two occasions by the administration of atophan. On the first occasion the daily output of 11.38 grains was reduced to 6.9, and on the second from 14.63 grains to 5.7. Judging by this result it is necessary to estimate the uric acid output during the exhibition of atophan.

It may be of interest to append the calcium content of those foodstuffs which contain more than a minimal amount of this substance. The figures are taken from A. Neuberg's statistics.<sup>11</sup>

TABLE IV.—Calcium Content of Foodstuffs.

Foodstuff.	Total ash. %	CaO % in ash.	CaO in 1000 gms. of food-stuff.	Foodstuff.	Total ash. %	CaO % in ash.	CaO in 1000 gms. of food-stuff.
Spinach ...	16.48	11.87	19.6	Endive ...	16.18	12.03	19.5
Celery ...	11.04	13.11	14.5	Oatmeal ...	2.8	7.42	2.08
Rhubarb ...	14.44	10.04	14.6	Plasmon ...	8.69	32.68	2.85
Cow's milk	0.72	22.42	1.62	Quaker oats	3.14	3.73	1.10
Cheese, Parmesan {	6.29	34.72	2.18	Brown bread {	2.27	1.12	0.25
Pork ...	4.06	7.53	3.06	Potatoes ...	3.79	2.64	1.00

Drinking water is at all times a source of calcium in the diet, and in certain districts this may reach a high figure.

To Dr. F. W. Mott and Dr. William Hunter I must express my sincere acknowledgment for taking the cases into their wards in Charing Cross Hospital. I must also thank Professor W. D. Halliburton for affording me every facility in his laboratory, and my assistant, Mr. J. C. Drummond, B.Sc., for doing the major part of the work.

#### Summary.

1. The excretion of calcium in the urine of gout is lower than the accepted normal. However, the urinary content forms, as is usually the case, a small fraction of the total output, most of the calcium leaving the body via the faecal excrements.

2. The effect of administering calcium chloride in two cases of gout, kept on a fixed diet, was to cause a slight retention of nitrogen, but the phosphorus metabolism was practically unaffected.

3. The effect on total calcium metabolism was not constant. In one case a small negative calcium balance was transformed into a small positive one; in the other the positive calcium balance was reduced. In both cases the urinary calcium was not affected.

4. In the four cases observed the giving of calcium chloride produced a marked fall in the uric acid output in the urine. The explanation of this observation is not at present forthcoming; it suggests that the administration of food rich in calcium should be restricted in cases of gout.

## JOURNALS.

*Quarterly Journal of Medicine.* Edited by WILLIAM OSLER, J. ROSE BRADFORD, A. E. GABROD, R. HUTCHISON, H. D. ROLLESTON, and W. HALE WHITE. Vol. X., Nos. 37 and 38. October, 1916, and January, 1917. Oxford : At the Clarendon Press ; London, Edinburgh, New York, Toronto, and Melbourne : Humphrey Milford. Subscription price, 25s. per annum. Single numbers, 8s. 6d. net each.—The contents of this number are : 1. Septicæmia due to *Moroccoccus tetragenus* as a Cause of Pyrexia at the Front, by A. H. Birks, R. T. Thornley, and R. A. Fawcett. From a study of obscure cases of pyrexia occurring at the front at the present time the authors conclude that a large proportion of all these cases are septicæmias which fall into two general types, one clinically resembling paratyphoid, the other being called "trench fever." The most common of these septicæmias is tetragenus fever due to the *Moroccoccus tetragenus*. These cases appear to have some characteristic features—namely, a sudden onset, headache, and pains in the lumbar regions and down the legs, with tenderness over the tibia. Anæmia is common and lethargy is the most characteristic mental state. 2. A Study of the Metabolism in a Case of Amyotonia Congenita, by F. Powis and H. S. Raper. A case of this condition is described in a girl aged 4 years, upon whom metabolic investigations were made in three separate periods of five days each. The chief conditions noticed were a diminution of hepatic functional activity manifested by the presence of acholia, a normal calcium retention with a relatively high potassium retention, and a low creatinine excretion with a relatively high creatine excretion. The authors state that they have published this account of a single case in order that other investigators may be able to confirm or disprove the constancy of these abnormal features. 3. Records of Speech in General Paralysis, by E. W. Scripture. An interesting study of the speech difficulties in general paralysis investigated by means of a special recording apparatus is here presented. An analysis of the records obtained apparently calls for very minute investigation, so that a single sentence may require something like five hours to analyse, but the results obtained throw an interesting light upon the nature of the speech disorders. The chief condition observed is one to which the name asphasia is applied as a substitute for the misleading one of cortical ataxia, to indicate a lack of precision in speech. Dr. Scripture finds that asphasia is an early symptom in the record of the general paralytic, whereas it never occurs in neurasthenia. 4. The Retinitis of Arterio-sclerosis, and its Relation to Renal Retinitis and to Cerebral Vascular Disease, by H. Foster Moore. This paper is based upon a careful examination of the clinical and ophthalmic conditions found in 66 patients seen at Moorfields Eye Hospital and 44 seen at St. Bartholomew's Hospital. The changes in the retina and its vessels occurring in arterio-sclerosis are carefully recorded and their relative importance discussed. The work of Marcus Gunn upon the same subject is confirmed and extended. Next Mr. Foster Moore brings forward evidence tending to establish the existence of an arterio-sclerotic retinitis as a clinical entity. He then studies the relation of sclerosis of the retinal arteries to cerebral arterio-sclerosis, which he regards as both striking and conclusive. The paper is illustrated by some admirable drawings and coloured plates. 5. On the Early Stages of Wounds in the Chest. Cases of chest wounds have been studied by Colonel Sir W. P. Herringham at a casualty clearing station near the front. Unless a case shows symptoms of sepsis, or has some complication rendering it more severe than usual, it has been found by Sir W. P. Herringham best to send the case back to the base when 72 hours have been completed from the time that the wound was received. Of 211 consecutive cases, 22 died at the clearing station and the remainder were evacuated to the base. Haemothorax is almost always present. Congestion of the opposite lung apparently occurs very frequently, but is only dangerous if it is of large extent and the wounded lung is useless. 6. Jaundice of Infective Origin, by Colonel Sir Bertrand Dawson and Colonel William E. Hume. This paper deals with jaundice due to a spirochæte, and it is differentiated from other forms of infective jaundice. It is illustrated by several excellent coloured plates and is an important contribution to the subject with which it deals. This paper has already been noticed in a leading article in THE LANCET of Feb. 3rd, 1917. 7. Lipodystrophy

Progressiva, by Dr. F. Parkes Weber. A critical review with a bibliography of this rare and interesting condition is given, and its pathology and relation to other disorders of the subcutaneous fat are discussed.

*Journal of Nervous and Mental Disease,* February, 1917.—This number contains full reports of meetings of the New York and Boston Neurological Societies at which last summer's epidemic of poliomyelitis was discussed at great length from various points of view. At the Boston Society statistics were given showing that 90 per cent. of cases were under 5 years of age and 4 per cent. over 15. The total mortality was 19.5 per cent., and the mortality figures were notably higher during the first half of the epidemic than during the second half. Dr. Edwin H. Place mentioned his results with immune serum, of which 10 c.c. doses were given two or three times in 24 hours. Three of 8 preparalytic cases treated with immune serum developed paralysis, while of 16 preparalytic cases not treated only 1 developed paralysis. Of 40 cases in which immune serum was administered 52 per cent. died; in 33 per cent. there was extension of paralysis, in 15 per cent. no extension. As chiefly the most desperate cases were treated with serum the poor results may perhaps thus be explained. As regards diagnosis at an early stage, obviously a matter of the first importance, several speakers discussed the significance of changes in the cerebro-spinal fluid. In the prodromal stage of from one to four days, while there may be little clinically to attract attention, the fluid may show gross alterations from the normal. In a series of cases recorded by Dr. Francis W. Peabody the fluid was found to be under increase of pressure, and cytological examination showed an average of 300 cells per c.mm., of which from 80 to 90 per cent. were polymorphonuclears. The smallest count in the prodromal stage was 34 cells per c.mm. and the largest no less than 1980. Within a week of the onset of paralysis the count diminishes and mononuclears to a large extent replace the others. The globulin at first is slight and increases in inverse proportion to the cells up to the third or fourth week. Apparently the attitude of the lay press in certain quarters, and of the public generally, left much to be desired, as several of the Boston speakers mentioned the "hysteria" that had surrounded the subject, more particularly in regard to schools and "senseless and useless" methods of quarantine. As there is little evidence in favour of the theory of direct transmission by contact, many of the precautions taken were stigmatised as "absurd." Nevertheless, in such affairs it is clearly the duty of the profession to lead the public, and though our knowledge of the epidemiology of the disease is still imperfect, restrictions ought not to be laid down in which the profession does not believe. At the New York Neurological Society the meeting was held in conjunction with the Neurological Section of the New York Academy of Medicine. There was unsparing criticism of the organisation and the methods adopted to cope with the epidemic. Dr. Frederick Tilney said that the epidemic, the third in nine years, found them unprepared. "Quarantine was a travesty, and hospitals were not ready." Among much domestic criticism which scarcely concerns us reference may be allowed to the fact, emphasised by speaker after speaker, of the lack of coöordination and coöperation between the State health authorities and the professing neurologists of the city of New York. The neurologist was apparently ignored. It was stated that the important report of the Committee of the New York Neurological Society on the epidemic of 1907 (reviewed in THE LANCET of July 9th, 1910) seemed to have been forgotten by those who had the official control of affairs. Eventually it was resolved that the Academy of Medicine should be asked to consider the advisability of appointing a poliomyelitis commission, with four subcommittees, to consider ways and means best calculated to meet and combat a future epidemic: first, a committee on communicability and quarantine, comprised of bacteriologists and epidemiologists; second, a committee on the clinical aspect of the disease, consisting of neurologists, paediatricians, and orthopaedists; third, a committee on pathology, consisting of pathologists; and, fourth, a committee on treatment and immunisation, comprising neurologists, orthopaedists, paediatricians, and bacteriologists. Here in England we have not had such overwhelming epidemics as have ravaged other parts of the world, but it behoves us to profit from the trying experiences of others.

# THE LANCET.

LONDON: SATURDAY, MARCH 31, 1917.

## Medicine and State Control.

THE possibility that the profession of medicine may be transformed by various influences and for different reasons into a State service is frequently alluded to in the public press, and the reason of this is obvious. Medical men are required urgently for the Army and Navy, and no less urgently of the civilian population, and it is evident that if the State were the employer the existing supply would be at the absolute disposal of the authorities without further formality. This consummation may be desirable, but it seems to medical men that there is little general comprehension of what a State Medical Service means. So long as the principal rôle of medicine was to deal with full-blown disease, or to remove acquired disabilities, its practice remained largely a personal matter between doctor and patient, the State merely stepping in to insist that the doctor's claims to treat and relieve were based on a certain minimum of training and attainment. With the dawn of preventive medicine, as evidenced by the desire to stem disease at its source and to avoid the occurrence of physical disabilities, the concern of the State in the matter became intimate, for legislation was required to bring these desirable things about. Thus one Government department after another assumed the control of branches of medical practice in which they were specially interested and appointed special staffs to advise the department on medical matters. The evolution of a medical service to a high degree of importance and efficiency is apparent, of course, in connexion with the Army, where within a generation a sanitary organisation has been created under which typhoid has disappeared from the forces waging the greatest war the world has ever known. But let us not forget that even now the anomaly persists of the Director of the Medical Services having no seat on the War Council and being subordinate to the Adjutant's department. Civilian medical practice is similarly not represented directly in the government of the country, and has not a Minister responsible to Parliament and backed by the support of the people. If the Bill, whose introduction is expected by Lord RHONDDA, the President of the Local Government Board, recognises this point of view, it will assuredly command full medical support.

A unification of the medical services of the country would be the immediate outcome of the appointment of such a Minister. For a long time past the Local Government Board, the Board of Education, the Home Office, and the Board of Trade have had their own medical departments. The National Insurance Commissioners have more recently become largely

responsible for certain uniform medical treatment throughout the country, and here some order exists in the employment of research workers, pathologists, chemists, and bacteriologists in systematic action for the prevention as well as for the detection of disease—we refer to the Medical Research Committee. Elsewhere no such order can be found. During the war the medical services of the Navy and Army have developed enormous activity; the Ministry of Munitions has come in with a far-reaching scheme of industrial hygiene; the Pensions Ministry is dealing with the colossal problem of the disabled soldier, and the Ministry of Labour is now joining it in this work. Perhaps the Minister of Blockade is the only member of the Government who has no medical staff. This divided control means not only confusion and dissipated energy from overlapping, but inevitably leaves places which are no-man's-land. Although the infant is now the object of assiduous care of a Government department, the child of 2 to 5 years has abundant opportunity to develop disease and disability, which is often too advanced for simple and efficient treatment when observed by officers of another medical department. The persistence of that terrible plague ophthalmia neonatorum may, as the recent report of the Central Council for District Nursing in London indicates, be largely attributed to dual notification and control. The general practitioner who attends his patient throughout the seven ages of man is under the observation of as many Government departments in doing so. A Ministry of Public Health, whose rôle it should be to care for the health of the citizen "from the cradle to the grave," as Mr. LONG expressed it, would tend towards efficiency and economy, and initiate a new era in the history of public health. Lord RHONDDA stated recently, when receiving a deputation from the British Medical Association, that he was for such a health department with an advisory medical council to assist it, without repeating Mr. Long's claim that the head of the Local Government Board was himself really the Minister responsible for public health.

All agree that due recognition of the importance of medical science to the nation is desirable, and those who have thought the affair out hold that the unification of central medical control must, to this very end, be worked for. Opinion varies widely on the best method of delegating the central authority. To the official mind a civilian State Medical Service with fixed salaries and orderly gradation from higher to lower authority is the natural solution. The official view is apparently proved by recent experience of the efficiency of the Army Medical Service. But there are many—discipline prevents accurate knowledge of how many—who chafe under the official régime, feeling that their powers are not being used to the best advantage therein. And it must not be forgotten that an overwhelming proportion of the present Army Medical Corps is made up of drafted-in civilians, who have been free to shape their own careers, and who are not at all convinced that the prescribed pattern is very good. And the nation does not like the official attitude

towards its ills. Dr. ESTHER CARLING, chief medical officer of the Berks and Bucks Joint Sanatorium, has told us that town councils cannot deal sympathetically with infant welfare work; and half a century of conscientious practice by Poor-law doctors has not removed the popular prejudice against the Poor-law infirmary. The general practitioner continues to absorb the main esteem of the public, and Sir T. CLIFFORD ALLBUTT's fear of taking out of the general practitioner's hands the responsibility for treatment of many kinds is widely felt in the medical profession. But it would be met by Mr. H. B. BRACKENBURY's offer to Lord RHONDDA to elaborate a scheme for utilising the general practitioner in a unified Health Department. The President of the Local Government Board, in welcoming this suggestion, has stated that his legislative plans are adoptive and present no obstacle to its realisation.

### The Prevalence and Treatment of Cerebro-spinal Fever.

COMPULSORY notification of this disease came into force for the whole of the United Kingdom in 1912, so that opportunity has been thereby afforded for study of its prevalence in this country during war-time, as compared with pre-war conditions, although difficulties in connexion with diagnosis render the statistics at present available somewhat unreliable. With this proviso, the following figures were given recently by Lieutenant-Colonel S. MONCKTON COPEMAN, F.R.S., officer in charge of the hygiene department of the Royal Army Medical College, in an address delivered at the Royal Institute of Public Health:—

Year.	Notification of cerebro-spinal fever.	
	Civilian.	Military (excluding cases originating overseas).
1913 ... ...	279	—
1914 ... ...	315	—
1915 ... ...	2566	1146

The weekly numbers of both military and civilian cases notified during 1916 up to August 31st were indicated in a chart published in the Report of the Medical Officer of the Local Government Board for 1915-1916. It could be seen from this chart that a considerable outbreak of the disease occurred in the early part of 1915, its maximum incidence being reached in the week ending March 13th. In the following year the maximum incidence was less in amount and fell later in the year, but Colonel COPEMAN pointed out the possibility that some of this difference was due to the larger number of men over-seas in 1916 than in 1915, although he reminded his audience that by 1916 the military housing conditions had improved, especially as regards ventilation and the prevention of overcrowding, factors from which much good would naturally be expected.

In a recent issue of THE LANCET we referred to the fasciculus of the *Times* "History of the War" dealing with the epidemic of cerebro-spinal fever

in 1915, and we take the opportunity of modifying a sentence in which we appear to reflect upon the accuracy of our contemporary's history. It was a correct statement in the *Times* that the Director-General of the Army Medical Service invited the Medical Research Committee to come to his assistance when preparing a plan of campaign, having regard to the grave menace to the troops in training throughout the British Isles. The plan was drawn up promptly upon the advice of Dr. MERVYN GORDON, already the author of admirable work in connexion with the bacteriology of the disease, and when later Dr. GORDON was gazetted as a major in the Royal Army Medical Corps, the Medical Research Committee provided his whole-time service for the country on full colonel's pay, on the understanding that the appointment was definitely made by the War Office, and that in devising any arrangements he had the official authority of the War Office and would not be acting merely as a scientific worker employed by the Medical Research Committee. No appointment could have been made more suited to the needs of the situation. Dr. GORDON and Colonel HORROCKS, the adviser on sanitation to the Army Council, made immediate inquiries into the outbreak of the disease that had occurred in the Canadian camps, and later Surgeon-Colonel R. J. REECE, who is now in charge of the military statistics on the subject, was associated with the work. Surgeon-Colonel REECE has informed Colonel COPEMAN that when the revised official figures are available there will be found evidence that in each of the years 1915-1916 the rise in military notifications definitely preceded similar increment in the civilian numbers, thus probably indicating spread of the disease from the military to the civilian population, in which extension the Canadian troops appear to have been specially concerned. The precautions taken in view of the possibility of wide extension of the disease, especially in the new armies under training, were sound and far-reaching. Not only were cases isolated as they occurred, but contacts were segregated, and, in each case, bacteriological examination of cultures was obtained by swabbing the naso-pharynx. Those found not to be harbouring the meningococcus could thus be returned to duty with the least possible delay, while the remainder were isolated until positive results were no longer obtained. A central cerebro-spinal laboratory was equipped at the Royal Army Medical College, and no less than 37 district laboratories in the country were started or coopted with their existing staffs. In these circumstances, pointed out by Colonel COPEMAN, it has been found possible to release about 70 per cent. of the contacts within 24 to 48 hours, and the majority of the remainder within two to four days later, whereas in the absence of bacteriological examination it would have been necessary to retain from duty all these men for three weeks, the average period during which the organism has been found to persist in the naso-pharynx.

Determination by Colonel GORDON of the special characteristics of the meningococci from the cerebro-spinal fluid of cases of the disease has shown that

these may be of four specifically distinct types, of which two are most frequently isolated; but, said Colonel COPEMAN, the type may vary at different periods during the same outbreak. These facts will be recognised as having an important bearing on the question of specific treatment, as a serum produced by the use of meningococci of one type will be practically valueless in the event of the outbreak being associated with another type of the organism. In absence of determination of the special type of meningococci, obviously the likelihood of obtaining satisfactory results from specific treatment will lie in the use of a serum polyvalent for all types, and encouraging results have followed the use of such a polyvalent serum produced by the Lister Institute and others, as noted by Surgeon-General H. D. ROLLESTON in his recent report on Cerebro-spinal Fever in the Navy.<sup>1</sup> In the event of the meningococcus being isolated from the throat, as well as from the cerebro-spinal fluid of a case suffering from the disease, it has been found that the type in each instance will be the same. This also holds good for cultures from the naso-pharynx of positive contacts of the case, a fact which has on occasion proved of special service in the tracing of possibly unsuspected carriers.

As there are certainly indications of the existence of the disease at the present season in several localities, it is well to publish in full Colonel COPEMAN's remarks on its spread and the methods of prophylaxis to be adopted. He said:—

As regards the spread of the disease, the trend of opinion is towards considering the healthy carrier as being for the most part responsible. Several observers, however, have found the meningococcus present to the extent of at least 2 per cent. in the naso-pharynx of non-contacts from non-epidemic areas—in other words, from the general population—so that it is obvious that further information is needed as to the precise circumstances under which spreading of the disease takes place.

*Prophylaxis; Treatment of carriers.*—The meningococcus being one of the least resistant of pathogenic bacteria and easily killed by various disinfectant substances in low concentration, the question arose as to the feasibility of destroying it *in situ* in the naso-pharynx by disinfectant solutions, or sprays.

As regards personal prophylaxis, good results have been obtained by *nasal insufflation* of 0·5 to 1 per cent. solution of chloramine, or of 1-5000 permanganate dissolved in normal saline. For prophylactic treatment of large bodies of men, as also for the clearing up of chronic carriers, promising results have been obtained by causing steam to pass through an *inhaling-room*, the air of which is charged with steam and fine droplets of antiseptic solution sprayed by a steam atomiser. The solutions sprayed have been either 1 per cent. zinc sulphate dissolved in normal saline, or in cases of chronic carriers 1 to 2 per cent. of chloramine. The men remain in the inhaling-room for five minutes, during which they inhale vigorously through the nose.

This simple and detailed instruction will be of service to our readers.

<sup>1</sup> THE LANCET, 1917, i., 56.

Major H. MacCormac, R.A.M.C., will read a paper on Skin Diseases under War Conditions in France before the Dermatological Section of the Royal Society of Medicine at the Society's House on Thursday, April 19th, at 5 P.M. A discussion will follow.

## Annotiations.

"*Ne quid nimis.*"

### WORKHOUSES AND FOOD RESTRICTIONS.

Boards of guardians appear to approach the questions raised by Lord Devonport's effort to restrict the consumption of certain staple articles of diet from different points of view. In the notes recording meetings of guardians in a recent issue of the *Local Government Chronicle* occurs an account of a discussion raised at Liverpool upon a revised scale of dietary for the officers of the workhouse. The allowance of meat appears to have been reduced, to what amount is not stated; but "formerly" the weight assigned weekly to each officer was 11½ lb. A member of the select vestry, who called attention to this figure, expressed not unjustifiable surprise at the digestive powers of those who ate so much. No suggestion, however, seems to have been made as to the substitution of any other kind of food to take the place of the mass of meat which would have to be held back if Lord Devonport's scale were to be adopted. At another guardians' meeting, that at Goole, one of the innovations proposed in the dietary consisted in the substitution of rice-pudding for roast beef, potatoes, and bread in the Sunday dinner for inmates. It was decided after some discussion to make the other reductions proposed in the dietary for week-days but to leave the Sunday dinner as before. No mention is made in the report as to any suggestion of difficulty in the obtaining of potatoes, so possibly the workhouse at Goole is self-supporting in this matter, or has otherwise accumulated a stock. It does not appear either to have been suggested that more economical ways of cooking meat than by roasting it, and the adoption of other foods to lessen the consumption of potatoes and bread, would have afforded a *via media* between the normal Sunday meal of peace-time and the somewhat cheerless alternative of rice-pudding. In another union, that of Kingsbridge, the discussion turned mainly upon the bread ration. Two 4 lb. loaves seem to have been the normal allowance for inmates of Kingsbridge workhouse per week, and the master declared that 7 lb. 5 oz. per head would be the least amount that would suffice. The chairman of the board in support of this view stated emphatically that no working man could subsist upon 4 lb. of bread a week, an opinion which, taken by itself, is reasonable enough. In discussing the dietary of a workhouse, however, it might be borne in mind that such an institution differs from a workman's home, and that its inmates are not labourers in full work. The workhouse has a kitchen and cooks who either are, or ought to be, sufficiently trained to be able to prepare palatable and nourishing dishes without exceeding the limit for meat, dishes, moreover, which would not have to be supplemented by an undue consumption of bread. That an increased, and increasing, expenditure upon food has to be faced by guardians is obvious. They have, however, an advantage besides that of kitchens in which food can be prepared upon a large scale. Owing to their being able to buy upon a large scale they can obtain their supplies more cheaply than private individuals, and there can be no reason why inmates of workhouses should con-

sume more bread, meat, and sugar than their fellow men, or why the possibly unwelcome innovations, which all are now introducing into their daily meals, should be excluded from Poor-law institutions.

#### THE NATION'S TOBACCO BILL IN WAR-TIME.

ACCORDING to the honorary statistician of the British Anti-tobacco and Anti-narcotic League the tobacco bill of the nation for the year 1916 has exceeded that of the previous year by £8,650,000, the total expenditure now reaching the figure of £48,630,000. The increase in consumption, however, according to the same return, is out of all proportion to this, for it is 3·8 per cent., as against 21· per cent. expenditure. The increase in consumption, it is interesting to note, since 1911 is 24· per cent., and the increase in expenditure 53· per cent. It may be concluded that the increased expenditure includes the raised cost of tobacco and duty. Considering, therefore, the increased inducements to smoke owing to the war this advance in consumption is not so large as might have been expected, although the total amount consumed and the money expended upon it appear as formidable figures. Well-meaning people are calling attention to these statistics and ask that some steps should be taken to effect a substantial reduction in this bill in the interests both of economy and the nation's health.

#### VESICAL CALCULUS AFTER WOUNDS OF THE BLADDER.

AT a recent meeting of the Académie de Médecine of Paris, M. F. Legueu called attention to the frequency of calculus after wounds of the bladder. Among 32 cases under his observation he found calculus in 10. Its formation has been explained by infection. But all wounds of the bladder are infected, and the infection does not last longer and is not more severe in cases in which calculus forms than in those in which it does not form. M. Legueu noticed that calculus formed only in cases in which the wound of the bladder was accompanied by fracture of the pelvis. He, therefore, concluded that the calculus must be an indirect effect of the fracture. When a foreign body enters the pelvis it almost always breaks bone in its passage. The fracture is doubly complicated—by communication with the exterior and with the bladder. The urine reaches the site of fracture and fragments of bone enter the bladder. M. Legueu has found them implanted in its wall or included in the calculus. When there are no splinters of bone minute particles pass through the fistula, and it is to them, he thinks, that the formation of the calculi is due. Long after the cicatrisation of the external wounds he has found, with the cystoscope or during operation, an osteopathic fistula connecting the bladder with a focus of osteomyelitis. Through this fistula bone powder falls into the bladder, and remains there the more easily as the patient is immobilised on his back for a long time by the fracture. This insoluble powder becomes the nucleus of crystallisation of calculi. All the calculi which he observed were soft, pliable, and white. When broken a small sequestrum was rarely found at the centre; more often nothing was found, for the powder which gave rise to calculi had been reduced to imperceptible particles. As to the treatment, cystotomy for the purpose of detaching the bladder from its point of adhesion to bone and closing the fistula was not successful. The

bladder is torn in the process, and repair, already difficult, is rendered more so and the case is prolonged. In two cases M. Legueu followed this treatment, producing greater evils than those he tried to remedy. In all the other cases he performed lithotomy with good results. The operation is even possible if the calculus contains bony fragments which cannot be broken up. They can be extracted through the instrument. No doubt fresh calculi may form after the operation, but they can be dealt with by the same simple operation until the fistula closes and the formation of calculi ceases.

#### TUBERCULOSIS OF THE TONGUE.

THE frequency of localisation of tuberculous processes in the tongue as evidenced from the reports of necropsies and from clinical experience is somewhat rare, and it is therefore interesting to note five cases of this condition, observed in the Mayo clinic, in Rochester, U.S.A., published recently by Dr. Luigi Durante in *Il Policlinico*.<sup>1</sup> The reason of the relative infrequency of tuberculous lesions of the tongue, an organ so close to the source of infection, is probably due to two factors: the peculiar structure of the lingual mucous membrane being resistant to direct penetration by the bacillus and also the natural resistance which all striated muscle presents to bacillary localisation owing to the marked antibacterial action of glycogen towards all micro-organisms in general and to Koch's bacillus in particular. The age of the majority of cases of this disease is between 20 and 60 years, it is unknown in childhood when tuberculous lesions are frequent and widespread. These facts justify the conclusion that certain causes incidental to this period of life favour the occurrence of lingual tubercle, such as erosions of the mucous membrane produced by pipe-smoking, dental caries, and toxic glossitis, and also explain the relative frequency in the male sex. The beginning of the lesion is always characterised by specific connective-tissue formation in the shape of a tuberculous nodule situated either in the derma of the mucosa or in the lingual parenchyma, and from this origin two distinct clinical types follow, one in which development proceeds at the expense of the lingual derma, having characters approximating to those of cutaneous lupus, and the other where the intramuscular connective tissue is chiefly involved producing granulomata or being gummatus; they may closely simulate neoplasms or tertiary syphilis. Typical tuberculous ulceration has irregular outlines, with sinuous, soft, red edges, a yellowish base covered with easily bleeding granulations, and may occur in any part of the tongue, but has a preference for the edges and tip. The persistence of these two clinical forms, the ulcerative and the nodular, seems to be influenced by the condition and course which the tuberculous infection assumes in other parts of the body—that is to say, those forms which maintain for a long time the nodular type accompany a tuberculous infection, usually in the lungs, of slow course and without tendency to break down, or else are strictly primary, while those forms which tend to become rapidly caseous are habitually concomitant with and secondary to deep and destructive lesions in other organs. In the 5 cases now published by Dr. Durante 2 occurred in females and all between the ages of

<sup>1</sup> Surgical Section, Oct. 16th, 1916.

20 and 50 years. As no necropsies were made the diagnosis of primary lingual tuberculosis arrived at in 2 cases in the absence of any other apparent tuberculous lesion has only a clinical and not an absolute value. In the other 3 cases it was secondary to, and a late episode of, broncho-pulmonary lesions. In 4 cases the type of lingual lesion was ulcerative, situated at the edge, and the result of a granuloma deep in the parenchyma. In the other case the type was nodular and had remained in that condition for 10 years, and was the only tuberculous lesion ascertained to exist. In the remaining 4 cases the ulcerating stage was developed after three to four months. This shows that it is not so much the local site which determines the different anatomical aspect of a specific process, such as the tuberculous, as the conditions of reaction in the whole organism. There was glandular enlargement in the four ulcerative cases, but not in that where the intra-lingual granuloma remained intact. Clinical diagnosis was easy in three cases in which the ulcer in the tongue existed simultaneously with tuberculous pulmonary lesions. In all cases the nature of the lesion was proved, in two of them by excision and in the others by biopsies previous to treatment by cauterisation.

#### NURSERY SCHOOLS.

TEMPTED by the prospect of high wages, often in addition to the husband's earnings or a separation allowance, a large number of married women are now working in munition factories for periods of 8 to 12 hours on day or night shift. What time the mother has at home and does not spend in sleep she requires for rest and meals, leaving little or no opportunity for attention to the children. To these factors Dr. Sidney C. Lawrence, in his recent report to the Edmonton education committee, attributes the increased infantile death- and sickness-rate, as well as a return to the highly verminous condition of the children first revealed in 1908 by school medical inspection. In order to remedy this situation Dr. Lawrence proposes, not to prohibit married women leaving their homes without making proper provision for the children, but to accept the evil necessity and mitigate its drawbacks by providing for the children elsewhere. He prescribes the raising of the age of school admission to 7 years and the conversion of infant departments into voluntary nursery schools for the reception and maintenance of children from 1 month to 7 years of age, open day and night alike. In each such department he would retain the head-mistress as superintendent with the assistance of suitable "motherly" widows requiring a smaller wage than the school teachers, and he would invite older girls to attend for practical lessons in mother-craft. The expense, he says, of such a venture need not be great, as the Board of Education and the Ministry of Munitions are ready to provide 75 per cent. of the capital cost and a handsome subsidy towards current expenses—up to 7d. a child for 12 hours' attendance. A similar payment by the mothers would leave but a small remaining margin of expense for the local authority to defray. Dr. Lawrence's scheme has, we believe, attracted a good deal of attention and has not escaped criticism in details. On the desirability of providing some sort of other care for children whose mothers go out to work no diversity of opinion can exist, but the risk from infection incurred by segregating

numbers of young children together must not be lost sight of. Whooping-cough and chicken-pox are not at the age of 1 to 5 years the trifling ailments they are often supposed to be, and we now know that measles at that age is a very malignant disorder. Following one upon the other the risk to life is very great, and the larger the nursery school and the less skilled the supervision the greater the risk of catching these complaints.

#### SMALL-POX IN GERMANY.

SINCE the beginning of the year cases of small-pox have occurred in most of the administrative districts of Northern Germany, spread, it is stated, by tramps and wandering labourers. In February a small outbreak was reported in Berlin, leading to the compulsory notification of suspects and a strong recommendation for the revaccination of the civilian population. The *Deutsche medizinische Wochenschrift* of March 1st reports the number of cases in Berlin hospitals on that date as about 50, stating that they mostly arose amongst immigrants or occupants of lodging-houses, and suggesting the advisability of revaccinating adults above 40 years of age in view of Gins's statistical proof (*D. m. W.*, 1916, No. 38) that the immunity of the second vaccination at 12 years of age does not generally survive beyond the forty-fifth year. Practically all the cases were above this age. For a time revaccination in Berlin proceeded so briskly that lymph ran short.

#### THE ESTIMATION OF THE URIC ACID OF THE BLOOD IN BRIGHT'S DISEASE.

IN many clinical investigations the use of a colour scale provides a ready method of exact estimation of quantity in regard to substances of uncertain chemical composition or which do not lend themselves to isolation and weighing. Dr. Paul Bartholow, assistant in applied therapeutics at the College of Physicians and Surgeons of Columbia University, has made an ingenious application of the method to the Brugsch-Kristeller test, which he considers to be the finest so far devised by chemists for the estimation of uric acid, depending as it does upon the rule that the reaction of uric acid and sodium tungstate in solution is marked by a blue colour. He describes the test itself as follows:

One c.c. of blood is sufficient, but it is generally convenient to draw 2 c.c. into a test-tube. When the serum is clear 0·1 c.c. is pipetted into another test-tube, and 2 c.c. of a 7·5 per cent. solution of sodium carbonate is added. To this 0·4 c.c. of a solution of sodium phospho-tungstate is added, and a blue colour, varying in degree according to the uric acid in the serum, spreads beautifully throughout the liquid. The solution of sodium phospho-tungstate is made as follows: 100 grammes of sodium tungstate are dissolved in 80 c.c. of 85 per cent. phosphoric acid and 700 c.c. of water; the whole is boiled several hours and diluted to 1 litre. In using this test in Bright's disease the best method is to compare the colour of the reaction with a colour scale. By running through a large series of reactions with normal serum and serum of Bright's disease, I have made a colour scale, increasing in intensity from 10 to 100. To give examples of its use: two cases of nephritis with retention gave values corresponding to 70 and 80 on the scale. A colour corresponding to 80 and 90 is characteristic of nephritis, parenchymatous and interstitial. Experience will accurately class those cases which give the deepest colour. It is not easy to determine the corresponding quantity of uric acid. If we add the test solution to a standard solution of uric acid and lithium carbonate we find, however, that the colour produced by 5 c.c. of this solution corresponds to 1 milligramme of uric acid in 100 c.c.

Dr. Bartholow recognises that there are possible fallacies inherent to the test. If the serum con-

tains any haemolytic products the reaction must be rejected. Too much serum must not be used, and the sodium carbonate solution should be added to the serum, not *vice versa*. It is possible also, he thinks, that solutions of sodium phospho-tungstate may produce the blue colour with other as yet unknown substances. His own experience, however, of the test, which is a large one, disposes him to think that much may be hoped from it, and that it may be a means of throwing fresh light on some dark corners of Bright's disease.

#### TÆNIA NANA IN HOLLAND.

IN Holland, as in many other European countries, the infection of human beings with tapeworms is not rare. The tapeworm most often met with is *Tænia saginata*, a parasite half an inch wide and 30 feet or more in length, the intermediate host of which is the ox. Dr. C. L. de Jongh has recently described<sup>1</sup> a case of infection with *Tænia nana*, better called *Hymenolepis nana*, which is the smallest of the tapeworms found in human beings, and measures only about half an inch in length and a fiftieth of an inch in breadth. So small a parasite as this is no doubt often overlooked, and this may explain the rarity of its recorded discovery; thus in 1910 only four examples had been noted in Germany, one in England, and none in France, although an endemic infection of the Liége coal-workers in Belgium with it had been described by Malvoz in that year. Dr. de Jongh's patient was a little girl at The Hague, aged 2, sent to the hospital with wasting and diarrhoea. The diagnosis of gastro-enteritis was made, but the ova of *H. nana* were found in the stools in great numbers. Treatment with santonin was unsuccessful; the exhibition of 250 of the seeds of *Cucurbita pepo* followed by castor-oil gave a satisfactory result, and the child made a good recovery. Dr. de Jongh discusses the few facts that are known with regard to the life-history of this intestinal parasite, and concludes that it is not identical with the *Tænia murina* so often found in rats and mice. It is not known what animal serves as intermediate host to *H. nana*, but possibly the human host serves as the intermediate host as well. Investigating the stools of the other members of the patient's family, Dr. de Jongh found ova of this tapeworm in the excreta of the father and two other children, but not in those of the mother and the youngest child; these three carriers of *H. nana* all had a tendency to diarrhoea, but the mother and youngest child had not. Treatment with the seeds of *Cucurbita pepo* relieved the two children of over a hundred of the tapeworms each. Dr. de Jongh is not able to explain how these four members of this family came to be infected with this tapeworm; they had lived in the same house for five years, and none had been out of the country except the father, who had ten years previously lived in Duisburg for a few months.

Queen Alexandra has appointed Mr. Hugh Mallinson Rigby, F.R.C.S., surgeon to Her Majesty's Household.

THE late Lady Grenfell has bequeathed £1000 to the Hospital for Sick Children, Great Ormond-street.

#### MEMORANDUM UPON SURGICAL SHOCK AND SOME ALLIED CONDITIONS.

THE phenomenon of oligæmia—or reduction of the volume of the blood in effective circulation—has figured prominently in the theories of surgical and traumatic shock (due, in the main, to American investigators) which have been current during recent years. There is no need to emphasise the importance at the present time of this condition, or that of the acute circulatory failure, similar to this in so many respects, which characterises some of the graver forms of infection and toxæmia. Information has reached the Medical Research Committee concerning some separate experimental inquiries into these conditions which are at present in progress on behalf of the Committee, and which promise to throw light on the production, by causes which have so little immediately obvious connexion with one another, of these groups of symptoms having so many points in common.

It appears to the Committee most desirable that clinical observations, bearing on the importance of the different suggested factors in the genesis of shock and allied conditions, should proceed concurrently with the further experimental investigations. They have, therefore, with the consent and aid of the investigators concerned—to whom they are greatly indebted—prepared the following preliminary notes for circulation among those having opportunity for clinical observation, and they have ventured to add some suggestions for the practical application of the results already gained, which seem to them worthy of attention and trial.

1. H. H. Dale and P. P. Laidlaw, whose primary object was a closer analysis of the shock-like phenomena produced by injection of various protein and bacterial poisons, of the sensitising antigen into an anaphylactic animal, &c., resumed, in the first instance, their examination of the action of the base  $\beta$  iminazolethylamine ("histamine"), the shock-like action of which they described some years ago. Taking readings of the haemoglobin value of the arterial blood with Haldane's haemoglobinometer, or of the percentage volume of corpuscles in the blood with a hematocrit, they find that the profound fall of blood pressure produced by this substance is accompanied by a striking concentration of the blood, amounting in some cases to a loss of one-half the original volume of plasma in about five minutes. The liver appears to be the organ most actively concerned in this reduction of the plasma-volume; but it is not exclusively responsible, for the phenomenon occurs, though less regularly, when the drug is injected after exclusion of all the abdominal viscera. The concentration is apparently effected not merely by loss of water and diffusible constituents, but by the passage into the tissues and lymph-spaces of all the plasma constituents, since the protein content of the plasma does not rise in proportion to the reduction of volume.

If an animal, moribund from this type of shock, is opened, it is found that the heart is executing muscular beats of moderate vigour, although the arteries are pulseless. The veins are not distended and the great veins fill only very slowly from the periphery if clamped. A large part of the blood, in fact, has disappeared from effective circulation, and the weakness of the heart-beat is due to defective inflow from the veins.

The condition cannot wholly be explained by the loss of plasma-volume above described, for Dale and Laidlaw have several cases on record in which the drug produced a "shock" of some severity, with the general signs of oligæmia as above described, but with no loss of plasma, as measured by concentration of corpuscles, or a loss so small as to be quite inadequate to explain the effect. They further regard a loss of tone of the smaller arteries as insufficient to account for the extreme circulatory depression (the still incomplete evidence points rather to these being constricted in these circumstances), and provisionally attribute the shock in the first instance to a widening of the whole capillary area in the viscera and the musculature. The active contractility of the capillaries has been frequently described, and important evidence of its existence in man has just been provided by Cotton, Slade, and Lewis (Heart, 1917). Dale and Laidlaw suppose that, under the action of the poison, the capillary tone is lost, so that, the blood from the arterioles being diffused and stagnant among the slack capillary channels, the quantity of blood reaching the veins is inadequate for the filling of the heart. The cardiac output falls in consequence to a very low level.

<sup>1</sup> Nederl. Tijdschr. v. Geneeskunde, Amsterdam, 1917, I., 541.

An attempt will be made to test by direct experiment this hypothesis of circulatory stagnation as the result of general loss of tone of the capillaries. About the main fact—that there is a depletion of the macroscopic vessels both on the arterial and venous sides—there can be no room for doubt; and it will be obvious how this deficiency of blood-volume, relative to the total capacity of the system, will be aggravated by the direct reduction of the blood volume, owing to loss of plasma into the tissue spaces which usually accompanies it. The already sluggish circulation will be further impeded by the increase of the viscosity of the blood, mainly due to the increase in the proportion of corpuscles to plasma. This change of viscosity has been directly observed by Trevan (*vide infra*). The slowness of the capillary circulation, again, through the muscles and other tissues needing a plentiful supply of oxygen, will lead to defective oxidation, with resulting acidity, and so to a further tendency for passage of water by osmosis from the blood, as suggested by Henderson. Lastly, the fall of arterial pressure, owing to defective filling of the chambers of the heart, and the increased viscosity of the blood, will so reduce the rate of the coronary circulation as eventually to interfere with the nutrition and oxygenation of the heart muscle itself. It will be seen, therefore, that when once the described condition is established a series of "vicious circles" is set up.

The determination of the change of plasma-volume from haemoglobinometer readings may be illustrated by an example. From a cat (under ether) an initial sample of arterial blood gave a haemoglobinometer reading of 80 per cent. When the profound shock produced by intravenous injection of 10 milligrammes of the biphosphate of histamine (about 3 milligrammes of the base) had fully developed—i.e., about seven minutes after the injection—a second arterial sample gave a haemoglobinometer reading of 120 per cent. In order to translate these values into relative volumes of corpuscles and plasma, we must know the initial ratio of these volumes, and assume a constancy of haemoglobin content in the corpuscles. The hematocrit showed that the corpuscles originally occupied one-third, and the plasma two-thirds, of the blood-volume, which is a normal ratio for a cat. The rise of the haemoglobinometer reading from 80 to 120 per cent. must be taken to indicate an increase in the proportional volume of corpuscles in the same ratio. So that the percentage of corpuscles has risen from  $33\frac{1}{3} \times \frac{120}{80} = 50$ . If the volume of corpuscles has remained constant this change of proportion indicates a fall of plasma-volume from 66·6 to 50 per cent. In other words, the plasma, which originally occupied twice as great a volume as the corpuscles, now occupies a volume equal to that of the corpuscles, so that one-half of the plasma has disappeared from the circulation. A hematocrit determination on the second sample actually showed the corpuscles and plasma occupying equal volumes, so that the assumption of a practically constant haemoglobin content in the corpuscles was justified. The only means, other than the loss of one-half of the plasma, by which such a change could be effected would be a doubling of the number of red corpuscles in circulation, and it does not seem credible that this could occur in the course of a few minutes. It should be noted, further, that the arterial blood, on which the readings were made, represents a mixture of all the blood reaching the heart from the different organs. Blood taken from the portal vein when the shock-like condition has been produced shows an even greater concentration than that from the arteries, and even this portal blood contains an undue proportion of blood from those of the capillaries in the splanchnic area in which the circulation is still relatively effective. It must be supposed that in many the vanishing arterial pressure is no longer able to maintain a circulation, so that the blood in them is stationary and its concentration extreme.

Being impressed with the similarity of such a condition to surgical "shock," Dale and Laidlaw have made a short series of attempts to produce such a shock in anaesthetised cats by prolonged manipulation of the abdominal viscera, which, as Mann and others have pointed out, is the only method by which a traumatic shock can be produced in *Carnivora*. In two cases profound shock, with no tendency to spontaneous recovery, was obtained, and in both these such a rise of haemoglobin value was observed, concurrently with the onset of the shock, as to indicate a serious depletion of the plasma-volume. In others a less profound shock was obtained, with a tendency to spontaneous recovery when the abdominal wound was closed and the animal left to itself under the anaesthetic; in these no significant change in the haemoglobin value was observed. In these cases also the manipulated bowels became conspicuously reddened and ultimately blueish in appearance, but the blood pressure could be temporarily driven almost to its original high level by compressing the whole mass of intestinal coils, and so driving the blood out of their capillaries into the general circulation. In these cases, therefore, such shock as was obtained seemed to be due purely to stasis in the abdominal capillaries, as previously described by Mann.

Meanwhile, Captain Marshall, R.A.M.C., had commenced a series of observations in France on the haemoglobin content of the blood in the different classes of case met with in a casualty clearing station. The Committee understand that among Captain Marshall's observations are some on shock, which support the view that loss of plasma into the tissues is an important factor in the condition.

2.  $\beta$ -Iminazolylethylamine (histamine) was chosen by Dale and Laidlaw for this investigation as a pure substance, producing effects of the kind under investigation in exact dosage. Effects of the same general type are produced by many products of protein digestion, bacterial products, &c. Among such effects those due to the so-called toxæmia of gas gangrene are of special importance at present. The resemblance between the symptoms of this condition and those of surgical shock or of a severe hemorrhage has frequently been described.

An investigation is now being carried out by H. H. Dale and J. McIntosh into the symptoms presented by animals dying after a local infection of the limb muscles by organisms of the gas gangrene group isolated from material obtained from fatal human cases. The onset of a fatal shock-like condition in such experiments has again been found to be associated with a progressive rise in the corpuscular content of the blood pointing to a steady loss of plasma. It may be pointed out that such an effect was perhaps to be expected. The capillaries in the tissues surrounding the infected muscle are so affected that an enormous local outpouring of plasma occurs. Whether the general symptoms are due to passage of the infecting organisms into the general circulation or to the absorption through the lymph channels of toxic products of the local breakdown of muscle, effects on the general vascular endothelium of a similar kind, though much less in degree than those produced by the concentrated local action, might be expected. A general loss of capillary tone and a morbid increase of permeability of capillary walls might therefore be expected to result from absorption into the general circulation of the fluids from the infected area. The evidence as yet available confirms this expectation, and suggests that there is a fundamental similarity of origin, underlying the similarity of symptoms, between the toxæmia of gas gangrene and other shock-like conditions. It must be remembered, however, that failure of the heart from any cause will be attended by some degree of blood concentration if the process is sufficiently gradual. More work is needed before the significance of the phenomenon in these cases can be estimated with confidence.

3. Concurrently with the foregoing investigations, F. A. Bainbridge and J. W. Trevan have been conducting an investigation into the genesis of shock by other means, and the same factor of concentration of the blood has presented itself in their observations. Their experiments hitherto have been mainly concerned with the effects on the portal and systemic venous pressures and on the general distribution of blood in the circulation, produced by repeated injections or by long-continued, slow infusion of adrenalin. The inquiry was suggested by the fact, demonstrated by Elliott, Cannon, and others, that extreme emotion or severe pain, which are factors in some cases of shock, are accompanied by an outpouring of adrenalin from the suprarenal glands. Bainbridge and Trevan have injected adrenalin slowly into a systemic vein in anaesthetised dogs for 20 minutes or longer, at a rate sufficient to maintain the arterial pressure at a supranormal level comparable with that attained during moderate stimulation of a sensory nerve. During the injection the portal pressure rose to, and remained at, a high level, while the systemic venous pressure was not significantly altered or even fell slightly. Meanwhile readings with the haemoglobinometer and the hematocrit showed a steady decrease in the volume of the blood-plasma relatively to that of the corpuscles. In one case the haemoglobin value rose from an initial 95 per cent. to 129 per cent. Such a relative increase of corpuscular content would involve a large increase in the viscosity of the whole blood; an actual determination showed an increase of viscosity in the proportion of 6·8 to 9·1.

When the injection of adrenalin was stopped, the arterial pressure rapidly fell to a low level while the portal pressure remained high, and the animal passed into a condition of shock, with feeble pulse and shallow respiration. The relation of the portal and systemic venous pressures indicated an obstruction of some kind to the flow of blood through the liver. This was made further evident, in the later stages of the effect, by the striking turgidity of the liver itself. If the flow of lymph from the thoracic duct was recorded, it was observed to undergo a striking acceleration, as the obstruction in the liver developed in consequence of the infusion of adrenalin. The nature of this obstruction is not yet clear, and will be the subject of further investigation. Its effect, especially after the cessation of the inflow of adrenalin has allowed a dilatation of the splanchnic arterioles, is a collection of a large part of the blood in the congested splanchnic area. When to this is added the

steady loss of fluid from the blood by exudation into the tissues, it will be seen that the final result, as regards the activity of the heart and the general circulation, will be closely similar to that described above in connexion with Dale and Laidlaw's experiments. The failure of the output of the heart from defective venous inflow, due to reduction of the volume of blood in effective circulation, leads to a profound collapse of the arterial pressure; the loss of plasma into the tissues not only aggravates this defect of volume, but, by increasing the viscosity of the blood, further retards such flow through the capillaries as the low arterial pressure could otherwise maintain; and this retardation yet further checks the venous inflow to the heart. The blood travels very slowly round the body under such conditions, and the supply of oxygen to all the tissues becomes inadequate. This inadequacy is accentuated by defective oxygenation of the arterial blood, which remains dusky in colour even with artificial respiration.

#### 4. Some Practical Suggestions and Inquiries.

(A) The point of most novel interest emerging from the above notes is the importance which the different sets of workers attribute to loss of plasma into the tissue spaces, as a factor in the production of the circulatory failure. The presence of such a factor was suggested by Henderson, Mann, and others, but its extent and significance have hitherto been rather vaguely indicated. Such loss of fluid from the blood, causing both deficient volume and excessive viscosity, has for some time been clinically recognised as an essential factor in the collapse occurring in conditions like those of cholera and bacillary dysentery, in which the fluid is lost through more obvious channels.

It is here suggested that clinical observation on changes in plasma-volume in traumatic shock, post-operative shock, and the toxæmia of gas gangrene may yield valuable information. The only instruments clinically applicable to the detection of such changes are the haemoglobinometer and the haematocrit. It will be evident that the interpretation of such observations will be a more complicated matter than that of results obtained under the controlled conditions of experiment; for an estimate of the plasma-volume by these methods depends on the assumption that the volume and haemoglobin content of the red corpuscles remains constant. It cannot, for example, be expected that a loss of plasma occurring in shock consequent on an extensive wound, with much haemorrhage, will be accompanied by an absolutely high haemoglobin-value or haematocrit reading. Again, in a protracted case of toxæmia from gas gangrene, the observation will be vitiated by the probability that, though plasma may be draining from the vessels into the tissue spaces, a coincident destruction of red corpuscles is taking place. It is hoped, however, that a careful selection of suitable cases for observation, and attention rather to change of the corpuscular content, as shown in a series of observations at short intervals, than to the absolute initial value, will enable information to be obtained as to the significance of this factor. It may be suggested that cases of traumatic shock without serious haemorrhage, of post-operative shock, of intestinal obstruction, of extensive burning, of anaphylactic shock, and of the rapid, fulminating type of toxæmia from gas gangrene, are likely to give relatively uncomplicated data for this purpose.

(B) The experimental results suggest that the removal of blood from effective circulation may be brought about in more than one way. It would be of interest to know whether different types of shock can be clinically recognised; in particular, whether a type with circulatory obstruction in the liver, as shown by swelling of this organ and congestion of the portal vein and its tributaries, can be differentiated from a type without this feature; and, if so, whether the nature of the primary cause of the shock has any relation to the type produced.

(C) Prevention.—If shock is, indeed, due to oligæmia, its many points of similarity to the collapse produced by a dangerous haemorrhage need no explanation. It will further be obvious that an antecedent haemorrhage, insufficient in itself to produce collapse, may be an important factor in the subsequent onset of shock, in so far as this condition is due to defective volume, apart from increased viscosity of the blood. The normal reaction to a simple haemorrhage, of sufficient severity to diminish the output of the heart and lower the blood pressure, consists in the abstraction of fluid from the tissues until the volume of the blood is again adequate to maintain the cardiac output. Dale and Laidlaw find that a similar dilution of the blood normally accompanies, and tends to correct, a fall of pressure due to arterial dilatation. In shock, according to the indications of the experiments already described, this restorative reaction fails completely and fluid continues to pass from the blood, though the arterial pressure has fallen to a very low level. It will be evident, therefore, that when shock is already imminent a relatively small haemorrhage may have a serious influence in determining its onset. Any other causes tending to diminish the blood volume, such as fatigue, exposure, or prolonged abstinence from food and

water, may be expected to predispose to shock for a like reason. Mention should be made also of the possibility that measures preparatory to an operation in hospital, if they include free saline purgation and severe abstinence from food and water, may contribute to the danger. Cases for urgent operation must constantly present themselves to the military surgeon, in which the antecedent conditions are those mentioned above as tending to depletion of the blood volume, and therefore predisposing to shock. A free supply of fluid, by infusion of physiological saline into the rectum or the subcutaneous tissues, as already used by many surgeons, may be expected to have a special preventive value in such cases. The indications, however, are that such measures, to have any value, must be begun before or early in the operation. When once the condition of shock has been developed, physiological saline, or Ringer's solution, even if injected intravenously in large volume, appears to have a very limited and temporary value; for the diluted plasma passes with increased rapidity through the slack and permeable walls of the capillaries, and the fluid leaves the circulation almost as quickly as it is run in.

(D) Treatment.—Unfortunately, little can be said as yet as to the treatment of shock and allied conditions when once developed. Suggestions only can be made of measures which may be tested with possible advantage and without danger. It is hoped that further experiment may warrant more positive recommendations at a later stage. Pituitary extract causes a prolonged and general contraction of the arterioles, and thereby diminishes the total capacity of the circulatory system and mitigates the effect of deficient blood-volume. The tendency of adrenalin to produce obstruction to the circulation through the liver, as described above, makes it probable that the use of this substance would, in some cases, eventually aggravate the condition which it was designed to cure; its action is, in any case, so fugitive as to be of little value. The action of pituitary extract is free from both these drawbacks; its value in some cases is already well recognised, and, with the ordinary measures for restoring and conserving the body temperature, needs no further mention.

The failure of injections of physiological saline in fully developed shock has already been mentioned. Experiments already made seem to indicate that better results might be obtained by the use of intravenous injections of hypertonic saline, the value of which in the treatment of cholera and bacillary dysentery is already familiar. Whether the action of these is entirely due to the passage of water into the vessels by osmosis, or in part to a restorative effect of the hypertonic solution on capillary tone, is not clear. In this connexion it may be recalled that calcium ions have been found to have a specific action in reducing abnormal permeability of capillaries (*cf.* Wright; also several papers from the Vienna school). It seems reasonable, therefore, to suggest that a fluid representing a concentrated Ringer solution should be used rather than one in which only the proportion of sodium chloride is increased. The following formula might be tried—

Sodium chloride	...	...	...	2 grammes.
Potassium chloride	...	...	...	0.05 "
Calcium chloride	...	...	...	0.05 "
Water	...	...	...	100 c.c.

and the value of increasing the relative calcium content beyond this proportion might cautiously be tested.

The deficient oxidation occurring in any condition of circulatory failure will lead to an abnormal acidity of the tissues, and thereby tend to raise the concentration and viscosity of the blood in the capillaries. Administration of alkalies should, therefore, help to relieve the condition, and injections of sodium bicarbonate, as recommended by Wright for the treatment of gas gangrene, should form a valuable addition to large injections of a hypertonic saline mixture. The limited solubility of calcium bicarbonate makes it advisable to give the bicarbonate solution as a separate injection. Hogan and Fischer recommend the following formula for an alkaline hypertonic saline:

Sodium chloride	...	...	...	28 grammes.
Sodium carbonate (crystalline)	...	...	20	"
Distilled water	...	...	...	2 litres.

Bayliss recently drew attention to the importance of the factor of viscosity in solutions used to replace blood lost by haemorrhage. He considered that gum acacia was a suitable substance to add to saline for such purposes, as imparting the requisite viscosity and as being a colloid with a definite osmotic pressure. Hogan and Fischer, on different theoretical grounds, have recommended the addition of 2 per cent. of gelatin to a saline solution for intravenous infusion. It will be evident, from what has been said above, that the aim in treating shock should be restore the volume of blood in effective circulation, and at the same time to reduce the abnormal viscosity. While, therefore, a small addition of gum to the saline fluid used for injection may be valuable, the proportion of 7 per cent., suggested by Bayliss, as

bringing the viscosity of the saline up to that of normal blood, would be unduly high. An addition of 2 or 3 per cent. of gum acacia to the saline solution above suggested might be tried; but it will be possible to make more definite recommendations when there has been time for experiment with solutions of different formulæ.

The defective oxygenation of even the arterial blood, in experimental shock as above described, suggests that inhalations of oxygen may have some value in these conditions.

The Medical Research Committee, whose address is 15, Buckingham-street, Strand, W.C. 2, will receive gratefully any reports upon clinical studies or experimental observations which may be sent to them as bearing upon the questions raised in this Memorandum. They hope it may be possible later to issue a further Memorandum, or series of reports, in which further results of the inquiries now in progress may be given, together with such relevant clinical observations as may then be available.

### PUBLIC DENTAL SERVICE.

THE particulars follow of certain dental clinics which have been established in various centres to provide proper dental treatment for adult patients whose incomes are below £160 per annum. It has not yet been found possible to arrange for dental benefits under the National Insurance Act, and as (in the present state of the finances of the country and of the Act) such treatment is not likely to be provided under a State-aided scheme, it is important to consider carefully what can be done by voluntary means to meet the needs of this class of patient. The schemes show that where these clinics have been established much good work has been accomplished in various important centres. They have generally been inaugurated and worked by the dental surgeons in the central town, apparently often as an incorporated body under the Companies Acts, so that the financial liability of the members is limited. In most cases it expressly stated that all the dentists in the locality favour the scheme; doubtless, many of the out-patient attendances must be made by the younger practitioners, but it is a matter of great importance that all the practitioners in the area, both medical and dental, should take a friendly interest in the movement. The anesthetics are administered by the local medical practitioners, and they should be represented on the local committees. It is interesting to note that in several districts the dentists consider the £160 income limit too high. In Bournemouth the income limit is fixed at £120 per annum; in Glasgow it is £104; in Nottingham there is a sliding income scale, with a different rate of fees for each class of income.

It is to be hoped that these clinics will not simply serve for the extraction of teeth and for the supply of artificial dentures, but that the preventive side of dentistry will be kept well in view. The excellent work which is begun in so many elementary school dental clinics should be carried on in these clinics for adults, which may also be made most useful centres for the spread of simple instruction in mouth hygiene, while forming an excellent medium for combating unqualified dental practice.

#### DENTAL CLINICS.

The Brighton and District Public Dental Service was founded in 1907 to provide treatment by qualified and registered dentists for persons unable to pay the usual fees, for those entitled to medical benefit under the National Health Insurance Act, and for others with an income not exceeding £160 per annum. The service uses the premises of the Brighton, Hove, and Preston Dental Hospital at 27, Queen's-road, Brighton, a moderate rental being paid to the hospital. There are two well-equipped surgeries, with the necessary waiting-rooms and offices. A member of the staff is in attendance during five evenings in the week. At present 27 dentists are on the list of the active staff, but most of the members of the profession in the district are associated with the service. Patients may select their own dentist, and are seen either by appointment at his house or at the rooms of the service. Fees are payable in advance at the office, but may be remitted in instalments. The takings are distributed quarterly to the members of the staff who have done the work after deduction of a percentage

for administrative expenses. The Service undertakes all the dental treatment provided in the district by the Domestic Servants' Insurance Society for its members. It received grants amounting to £123 for work done for the Soldiers' and Sailors' Dental Aid Fund until the closing of this Fund in January, 1916. Its scale of fees has been adopted by the East Sussex Insurance Committee as the basis of payment for dental treatment on account of sanatorium patients. From year to year there has been a steady, though slow, increase in the number of patients treated by the Service. The slow growth may be attributed to the absence of advertising which naturally places the Service at a disadvantage with the numerous unregistered practitioners who compete at equally low, or even lower, fees.

The present tariff is as follows:—

Ordinary extraction	1s.
ExtraCTION with local anaesthetic	2s. 6d.
Extraction with nitrous oxide gas	5s.
Filling	2s. 6d.
Filling, with root treatment	5s.
Scaling	2s. 6d.
Artificial teeth:	
Upper denture, from	10s. to £2
Lower	10s. to £2

The Reading and District Public Dental Service (Central office, 22-25 Chain-street) is affiliated to the Borough of Reading Medical Society, Limited, and was started in 1912. The Dental Service is an association of all the legally qualified dental practitioners in the borough, and is intended for those who are unable to pay ordinary fees, and who are either (a) subscribers to the Borough of Reading Medical Society; (b) insured persons attended by medical officers of the above society; or (c) persons residing in the neighbourhood of Reading who are subscribers to the Public Medical Service, or insured persons attended by medical officers of that Service. Each patient may select the member of the Service by whom he desires to be attended, but it is open to each member to limit the number of patients whom he will consent to attend, or decline to attend any individual patient. Fees are payable in advance and those for prosthetic treatment can be settled in instalments. The total fees approximate to £1000 per annum. The minimum and maximum fees are as follows:—

Extractions (ordinary)	1s.
Extractions (with anaesthetic)	2s. 6d. to 5s.
Special operations	3s. 6d. to 5s.
Dentures (vulcanite):—	
Large or full upper or lower	£1 10s. to £3 each.
Medium or small upper or lower	10s. to 30s. each.

The Bournemouth and District Dental Clinic, Ltd., was started in 1913 with a centre at "Edgemoor," Old Christchurch-road, Bournemouth, with the object of providing dental treatment, both surgical and mechanical, for patients of limited income. Twenty-two qualified dental surgeons of Bournemouth and district share the attendance at the clinic, of which the hours are 9 A.M. to 7 P.M. and 9-1 on Saturdays. Anesthetics, when required, are administered by medical men. The fees charged vary according to the weekly income of the applicant, and in cases of married people according to the number of children dependent upon them, but no person having a larger income than £120 per annum will be eligible for treatment. After working for a short while in order to gain experience a limited liability company was formed, the shareholders being limited to qualified dental surgeons, and five directors act as a committee of management. Expenses are met out of revenue, and after paying a fixed rate of interest on capital the balance is allotted half-yearly *pro rata* to the members who have done the work.

The Public Dental Service in Glasgow was inaugurated in 1913-14 on the lines of similar public services in the south of England, with the object of placing the highest dental skill and the best material within the reach of the less well to do. The Scottish Dentists' Association, Ltd., was incorporated on April 9th, 1914, under the Companies Act, in order to afford adequate protection to the members of the service. Under the memorandum and articles of association there can be no division of any profits amongst the members. Any surplus profit has to be used for extension of public dental services or kindred objects. The initial funds, amounting to £400, were subscribed by guarantee of members, who now number about 130. The first clinic was established in the Partick district of Glasgow in November, 1913; the second in Crown-street, in

the south-east district of Glasgow, in January, 1914; the third in Hamilton, a town ten miles south of Glasgow, the centre of a large industrial population, in July, 1914. These were fitted out on a common plan, including operating-room, waiting-rooms, and a room for lady attendant. The evening being the most suitable time to get into touch with the class for whom the service is intended, the rooms are open from 5 to 9 P.M. Between 5 and 7 P.M. the attendant receives patients and makes appointments, while from 7 to 9 P.M. the operators are in attendance each day except Sunday. Six dentists undertook to attend at each clinic, and they are supported by an adequate relief staff. It was laid down that the clinics were for the treatment of patients whose income did not exceed £104 per annum, the income standard of £160 under the National Health Insurance Act being held to be too high.

Local medical practitioners in the various areas have supported the clinics and expressed their appreciation of the service. About 2550 patients have been treated up to date, but since the commencement of the war the natural development of the clinics has been checked. Among the patients the alteration of hours of employment and restriction of lighting have conduced to a falling off in attendance, and many of the operators have gone on active service. The Hamilton branch, which was peculiarly affected by economic conditions, has been closed. On the outbreak of war three clinics, with a staff of 60 operators on day duty, were placed at the disposal of the military authorities. Gratuitous service was given in order to render dentally fit many recruits who would otherwise have been rejected, and during four months about 700 men attended for extractions, fillings, and dentures. The smallness of the number of recruits treated was probably due to the fact that the men could not be spared from training and were also frequently on the move. Subsequently, at the request of the Scottish Command, the association undertook to organise as a recognised centre the dental treatment of soldiers in Glasgow and a district including the counties of Lanark, Renfrew, Dumbarton, Ayr, and the town of Falkirk. During one year 6000 soldiers attended. 20,000 extractions, 6000 fillings, and the provision of 1500 dentures was carried out.

The minimum scale of fees was fixed at :—

Extraction without anaesthetic	6d.
" with local "	1s.
" with nitrous oxide "	3s. 6d.
" with other general anaesthetics "	10s. 6d. (Plus anaesthetist's fee.)
Fillings	3s. 6d.
" with root treatment "	1s. 6d.
Scaling	2s. 6d.
Dentures: Partial, per tooth	3s. 6d.
Minimum	7s. 6d.
Full upper or lower	£2 5s.
" with ext.	£2 10s.

The Nottingham Qualified Dentists Public Service was inaugurated in June, 1914, as a result of meetings held by the local branch of the British Dental Association, to which all registered dentists in Nottingham and district were invited. The premises are centrally situated at 2, Stratford-square, Shakespeare-street, Nottingham, and comprise a well-equipped surgery as well as anæsthetic room and the usual offices. There are 5 honorary and 16 active members, the latter attending daily from 9 A.M. to 8 P.M., except on Tuesdays and Fridays, when the Service is closed from 2 to 6 P.M. Dental treatment is provided for persons whose average weekly income does not exceed 50s. Applicants are placed in three classes: A. Those whose income does not exceed 25s. weekly; B. Those with incomes of from 25s. to 35s. weekly; C. Those with incomes of from 35s. to 50s. weekly—the fees varying accordingly, payable in advance and in small instalments if desired. There is free choice of dentist from the list, but no change can be made for the period of one year. Patients are seen at the dentist's private house as well as at the clinic. When war broke out, the organisation of the service was placed at the disposal of the local military authorities, and dental treatment was given free, until a scale of army fees was established, to men who would otherwise have been rejected for the army. The battalions raised by the local Parliamentary Recruiting Committee received dental treatment, more than 3300 patients being treated with 14,000 extractions and 7500 fillings. Up to September, 1916, the number of private patients treated by the service amounted to 365, with 1624 extractions, 206 fillings, and 172 dentures. The Service is now officially recognised as the centre for army dental

treatment in Nottingham, for the wounded in hospital, and for billeted troops. A dental clinic was formed in the summer of 1915 to provide dental treatment at a camp 20 miles from Nottingham. Two dentists from the service attended daily on five days a week. Members have also visited camps in the district to help the military authorities with work urgently needed. The council is at present considering ways and means of bringing the Service to the notice of those persons for whom it was intended. Public dental services, although organised for the benefit of the working classes, at present have no means of gaining publicity other than by recommendation from patient to patient.

The Birmingham Qualified Dentists Public Service was started in 1916 at 9, Great Charles-street, Birmingham, to give dental service to persons whose income does not exceed £160 per annum and who are unable to pay ordinary fees. Any qualified and registered dentist practising in Birmingham and district, if a member of the British Dental Association, is eligible for election as a member of the Service. The number of members is limited to 20. The management of the Service is in the hands of a committee consisting of the members and honorary associates for the time being, with an executive committee made up of the officers and five unofficial members. Any patient entitled to the benefits of the Service may select the member by whom he desires to be attended, but each member may limit the number of patients whom he will attend or decline to treat an individual patient. Minimum fees are fixed, payable in advance or by instalments in the case of prosthetic treatment. These are as follows:—

Ordinary extraction	1s. per tooth.
Local anaesthetic	2s. 6d. and 1s. per tooth after at same visit.
Gas	3s. 6d. and 1s. per tooth afterwards, maximum 10s. 6d.
Scaling	2s. 6d. to 5s. per sitting. Subsequent visits 2s. 6d. per visit.
Fillings, plastics, 2s. 6d., 3s. 6d., 5s. (according to cavity).	
" root fills,	7s. 6d. to 10s. 6d. (including filling).
" porcelain inlays,	7s. 6d. or 10s. 6d. (root filling 2s. 6d. extra).
" gold 10s. 6d. and upwards (root-filling 2s. 6d. extra).	
Crowns from 5s.	
Dentures, £3 10s., £5, and £6, according to style of denture.	
Complete upper or complete lower dentures, £2, £2 10s., and £3.	
Partial dentures, 3s. 6d. to 5s. per tooth, min. 10s. 6d.	

## THE BELGIAN DOCTORS' AND PHARMACISTS' RELIEF FUND.

### SUBSCRIPTIONS.

The following additional subscriptions to the Fund have been received:—

	£ s. d.
Sale of ladies' jewellery (per Dr. Colquhoun, Dunedin, N.Z.)	5 0 0
Dr. W. W. David	2 0 0
" La Tricalcine"	8 19 8
Mr. J. Y. W. Macalister	5 0 0
Dr. G. D. H. Carpenter (23rd donation—total, £23)	1 0 0

Subscriptions to the Fund should be sent to the treasurer of the Fund, Dr. H. A. Des Voeux, at 14, Buckingham Gate, London, S.W., and should be made payable to the Belgian Doctors' and Pharmacists' Relief Fund crossed Lloyds Bank, Limited.

### THE APPEAL FOR SURGICAL INSTRUMENTS.

Surgical instruments should be sent to the Master of the Society of Apothecaries, Apothecaries' Hall, Blackfriars, E.C.

**THE CAMPAIGN AGAINST VENEREAL DISEASES IN BELFAST.**—A Belfast correspondent writes: "The educational subcommittee of the Belfast branch of the National Council for Combating Venereal Diseases have arranged for courses of lectures to be given to teachers—men and women being separately addressed—social workers, and nurses, while a conference of the clergy to consider the question in its moral aspects has also taken place. All these plans are in line with the recommendations of the Royal Commission on Venereal Diseases, but thoughtful people are asking the question, Has education of the public ever yet stopped any epidemic? and the reason for such a reflection is that such a method only reaches those already convinced. The real enemy is never unmasked in this way, and until we adopt in civil practice what has already been done in the Army, both at home and abroad, actually *since this war broke out*—namely, notification, compulsory isolation, and treatment—it is hopeless to expect any real progress. It is unfortunately the case that audiences destitute of any medical training, after listening to lectures on venereal diseases, often take up entirely erroneous ideas, and in the end little real permanent good is accomplished."

## PARIS.

(FROM OUR OWN CORRESPONDENT.)

*The Treatment of Gas Asphyxia.*

Dr. Chassevant has recently explained the treatment he adopts in his ambulance for the victims of gas asphyxiation, which has given good results in his hands. The patients reached the ambulance, which was acting as evacuation hospital for the first line, from two to eight hours after being gassed. Some had already received first aid at a dressing-station or at other ambulances; some came straight from the trenches. All were subjected, at several sittings with intervals between, to the rhythmic inhalation of oxygen under pressure. Dr. Chassevant holds that oxygen inhalation as usually administered with an india-rubber bag has no efficacy; it is essential actually to insufflate oxygen on the lines of Dr. D'Arsonval's treatment of carbonic oxide intoxication. An india-rubber catheter is introduced far back into the buccal cavity, directly connected with the cylinder of compressed oxygen (such as is available at the pharmacies as reserve oxygen); by opening and shutting the regulator key active rhythmic insufflation at the rate of 15 or 16 to the minute is brought about. This treatment calms the dyspnoea, favours pulmonary aeration, and may be regarded as a true mechano-therapy treatment of the lung. Doctors and pharmacists who have been accidentally subjected to chlorine inhalation in the laboratory or on the field know how painful is the effort of inspiration; it is just this effort which the inhalation of compressed oxygen renders unnecessary. To combat the cardiac weakness Dr. Chassevant accompanies the inhalation of oxygen with subcutaneous injection of camphorated oil in large doses, 5 to 15 c.c. or more in 24 hours, as occasion requires. The author states that this method of treatment has been adopted by all to whom he has explained it. Oxygen under pressure is, in his view, the true antidote to intoxications arising from inhalation, assuring as it does the proper ventilation of the lungs. It is therefore desirable for every ambulance and dressing station to have at disposal several small and easily managed cylinders of compressed oxygen under pressure; they might even be available in the shelter-posts along with the portable fire-extinguishers.

*Fractures of the Humerus in Grenade-throwers.*

M. Chaput has reported to the Surgical Society the observations of MM. Kas and Rouéche on fractures of the humerus in grenade-throwers, specially frequent in the case of the instructor—i.e., men who have frequently repeated the same movement. The mechanism is the usual one of fracture by muscular violence; the humerus breaks by flexion inwards. In one case the length of the internal fragment allowed the movement of the arm to be completed. These fractures are presumably of quite spontaneous occurrence. Syphilis may play a part; but union occurs within a normal period.

*Parasitic Haemoptysis in the Yellow Races.*

MM. Salomon and Neveu have found, in the bloody expectoration of a native of Annam who showed signs of generalised afebrile bronchitis with apical congestion, the valvular eggs of a fluke, the *Paragonimus westermani* (*Distoma pulmonale*). The eggs contained pigment, and were clustered in groups of 30 to 40. The expectoration also contained cocci, erythrocytes, and numerous eosinophiles. An eosinophilia of 7 per cent. was present in the circulating blood. Radioscopy indicated the existence of fairly well-marked enlargement of the hilus glands. The authors place this case in the same category with three other cases of recurrent haemoptysis in Indo Chinese who had no stethoscopic signs of pulmonary bacillosis, nor any obvious lesions of the air tubes, but presented clinical signs of bronchitis accompanied by emphysema. The expectoration consisted of scanty coloured pellets floating in abundant sanguinolent mucus. Pulmonary distomiasis or infection with *Paragonimus westermani* is endemic in the Far East and in those parts of North America inhabited by Chinese or Japanese. The condition is frequently accompanied with bronchitis or bronchiectasis. It may give rise to cavitation and simulate pulmonary tuberculosis, both in auscultatory signs and in the resulting cachexia. The parasite is frequently harboured and disseminated by domestic animals—the pig, dog, and

cat. The presence on the French front of native soldiers and labourers from the Far East should direct the attention of medical men to these carriers of flukes, who are certainly numerous and might give rise to endemic distomiasis in France. Cases of protracted bronchitis with or without haemoptysis which have been in contact with the subjects of pulmonary distomiasis must be held suspect. Microscopical examination of the sputa, by establishing the existence in abundance of the characteristic eggs of the *Paragonimus*, permits of the prompt isolation and discharge of the infected person. It is important not to overlook these cases, which in the Far East give rise to considerable sickness and mortality.

March 27th.

## CANADA.

(FROM OUR OWN CORRESPONDENT.)

*The Medical Profession in Canada and the War.*

ACCORDING to a statement recently issued by Sir Edward Kemp, Canadian Minister of Militia and Defence, the Canadian Army Medical Corps number approximately 1800, of whom 500 are in Canada and the balance serving overseas. A large proportion of those in Canada are carrying on the work of the Canadian Military Hospitals Commission. In addition to the above numbers there are 400 civilian practitioners partially employed in military work in Canada, and over 400 Canadian doctors have proceeded overseas to join the Royal Army Medical Corps. In a short time other physicians in the Dominion desirous of serving will be given an opportunity of assisting in the work of attending invalided-soldiers returning to Canada. That work is now to be divorced from the Canadian Hospitals Commission and assumed by the Canadian Army Medical Corps, under the direction of a Director of Medical Services for Invalids, Commission continuing the provision of hospital accommodation as it is needed, and the maintenance and equipment thereof. Colonel Frederick W. Marlow, A.D.M.S., has made an official report to the Militia Department on the general arrangements of the Canadian Army Medical Corps. Travelling all over Canada, Colonel Marlow's work of inspection had a wide scope. His report has been considerably discussed since the Canadian Government made it public property. In general, Colonel Marlow recommends: The completion of the reorganisation of the Medical Service, thus bringing the medical branch of the service up to the required standard; the increasing of administrative staffs; the appointment in some districts of officers brought back to Canada from overseas; consideration of the advisability of increasing the Permanent Army Medical Corps for duty in Canada; frequent inspections of all districts and camps, for which purpose the appointment of an inspecting officer would seem advisable; dépôt units of fixed establishment to replace or supplement the present reinforcement plan, and closer relation between home and overseas service so as to minimise wastage; a plan whereby specialists may proceed overseas without undue delay in Canada; the gradation of officers entering the service, so that experience and special ability will count; the advisability of providing term contracts for service; improvement of laboratory facilities; installation of fumigating plants at camps and military hospitals; close co-operation between the Canadian Hospitals Commission and the Canadian Army Medical Corps; and the establishment of large hospitals in Halifax, Quebec, Montreal, Toronto, Winnipeg, Edmonton, and Vancouver. One of the recommendations, that of the transference of the returned soldiers to the Canadian Army Medical Corps from the Hospitals Commission, has already been adopted.

*The Freedom of the Canadian Expeditionary Force in Canada from Enteric Fever.*

The Provincial Board of Health for Ontario has supplied to date all the typhoid and paratyphoid vaccine used by the entire Canadian Expeditionary Force, about 450,000 men. In all, nearly 600,000 doses have been supplied free of cost. The Department of Militia and Defence have just announced that for the 12 months ending Dec. 31st, 1916, 167 cases only of typhoid fever were reported as having occurred amongst the thousands of men of the C.E.F., and this notwithstanding the fact that typhoid fever is a disease especially affecting young adults from 17 to 30 years of age,

and a disease which is endemic in all parts of Canada. This comparative freedom on the part of the force is seen to be most striking when it is recalled that, during the Boer War, one man out of every nine in the British Forces in South Africa was invalided through this disease, and that in the Spanish-American War, of 107,000 men in the camps at Tampa, Florida, and elsewhere, who had not left the shores of the United States, 20,000 contracted the disease. The remarkable change can only be attributed to the process of inoculation, and Dr. John W. S. McCullough, chief medical officer of health of the Province of Ontario, may be congratulated on the good results of systematic work.

#### *Canadian Medical Association.*

It has been decided to resume the annual meetings of the Canadian Medical Association, which have been suspended since the beginning of war in 1914. Dr. J. W. Scane, registrar of the Medical Faculty of McGill University, has been acting as general secretary since the departure of Dr. W. W. Francis for overseas service. Dr. A. D. Blackader has been elected President. The Past-President, Dr. Francis J. Shepherd, will deliver the address in surgery, and Dr. A. Mackenzie Forbes, who has recently returned from the front, has been appointed chairman of the Military Section. He has been promised a number of interesting papers from Canadian surgeons at present in England and France. The annual meeting is to be held in Montreal in the middle of June.

#### *McGill University and the War.*

The 43 graduates of class '17, McGill University, in medicine, have volunteered in a body to go overseas. Twenty-four are in a position to go overseas immediately, and the balance have started training. Old boys and present boys to the number of 1800 have been serving their King and country in the present great world conflict. Of those who have gone 132 have made the supreme sacrifice, and 163 have been wounded. One of the faculty has received the Victoria Cross, four the D.S.O., one C.M.G., one the Order of the Bath, and seven have been mentioned in despatches. Amongst professors and graduates who had recently had their names brought to the attention of the Secretary of State were Lieutenant-Colonel F. G. Finley, Captain James R. Goodsall, Colonel Lorne Drum, Major Lewis E. W. Irving, and Captain G. C. Hale.

#### *Medical Inspection of Schools in Toronto.*

About a year ago it began to be felt in Toronto that there was a waste of money in having medical inspection of school children conducted under the Board of Education. The City Council unanimously passed a resolution favouring the placing of medical inspection under the administration of the Board of Health. Although numerous conferences were held between the Board of Health of Toronto, the Board of Education, and the Provincial Government, no definite and satisfactory arrangement could be arrived at, as the Board of Education was strong for retaining the system they had adopted under their own immediate management. Ultimately the matter has been laid before the electors, when the people, by an overwhelming majority, voted in favour of medical inspection being placed under the Board of Health. Legislation will be sought at the present session of the Ontario legislature to provide for the transfer of responsibility.

Toronto, March 5th.

**ROYAL SOCIETY OF ARTS: INDIAN SECTION.**—At a meeting of the section held on March 27th Sir Havelock Charles, President of the Medical Board of the India Office, read a paper by Surgeon-General Sir C. Pardey Lukis, Director-General, Indian Medical Service, on Opportunities for Original Research in Medicine in India. The paper stated that there would shortly be two schools of tropical medicine in India—one at Calcutta and the other at Bombay. The former would be opened under the directorship of Sir Leonard Rogers as soon as the cessation of hostilities enabled them to furnish the necessary staff. The latter was associated with the Bombay Bacteriological Laboratory at Parel and was also approaching completion. The Government of Madras also had under consideration a scheme for founding a pathological institute in connexion with the Madras Medical College. Mr. Austen Chamberlain, who presided, appealed to the leaders of the medical profession in this country to make themselves acquainted with the opportunities offered by India, and not to grudge sending to India some of the best pupils they could produce.

## THE SERVICES.

### ROYAL NAVAL MEDICAL SERVICE.

The following appointments have been notified:—  
Fleet Surgeons: M. H. Knapp to *Inflexible*, and C. C. Macmillan, D.S.O., to *Bake*.  
Temporary Surgeon: M. Neilson, to *Vivid*.

### ROYAL ARMY MEDICAL CORPS.

Col. J. Turton (T.F. Res., A.M.S.) to be temporary Major.  
Lieut.-Col. J. G. Gill to be acting Colonel whilst employed as Deputy Director of Medical Services of a Division.  
To be acting Lieutenant Colonels: Major F. E. Roberts, D.S.O., whilst commanding a Stationary Hospital; Major E. F. Q. L'Estrange whilst commanding a Field Ambulance.

Major Sir J. Bland-Sutton, R.A.M.C., T.F., to be temporary Honorary Lieutenant-Colonel.

Capt. E. W. H. Groves, R.A.M.C., T.F., to be temporary Major.  
Temporary Lieutenants to be temporary Captains: T. Mulcahy, J. M. N. Paton, W. A. Berry, W. S. Melville, A. T. Gibb, E. H. Cameron, H. V. A. Gatchell, G. Macdonald, J. H. S. Sheppard-Jones, A. S. Burgess, R. P. Smith, W. M. McLaren, A. D. Morris, C. K. Carroll, C. B. Tudhope, A. Sandison, D. P. Thomas, A. G. Alexander, W. G. Harnett, A. J. Chillingworth, H. M. Harrison, R. A. Quinn, J. I. Bright, J. G. T. Thomas, B. S. Simmonds, D. S. Graham, A. A. E. Newth, J. R. Wyllie, H. W. Harding, G. C. B. Hawes, C. W. Morrison, J. S. Annandale, A. Morgan, J. T. H. Madill, N. J. Judah, J. B. Yelf, J. F. MacKenzie, J. K. Manlove, C. O'Malley, C. Townsend, J. B. Galligan, D. T. Evans, J. G. Lee, P. A. McCallum, W. Scott, H. Nuttall, J. Cathcart, W. G. Thomas, E. B. Morley, G. L. Lawlor, J. B. Fairclough, F. C. Conran, R. E. McLaren, S. R. Prall, H. C. Lindsey, W. Thomas, E. J. Dermott, D. G. Suttie.

To be temporary Captains: W. A. Brown, J. A. Glover (late temp. Capt.), F. W. Jackson, A. T. Wysard (Staff-Surg., R.N., retired), M. McK. McRae.

H. Maclean to be temporary Honorary Captain.

Temp. Lieut. C. J. B. Pasley, from General List, to be temporary Lieutenant.

To be temporary Lieutenants: R. McCaffrey, A. B. Jones, A. R. Leggate, B. P. Hynes, A. L. Candler, F. J. Lawson, L. J. Spence, J. Acomb, T. Howell, F. W. Hartley, S. Upton, R. J. Dick, W. H. Bonnett, W. H. Orton, P. J. Montgomery, W. L. Tindie, T. A. Jones, A. V. Boyall, G. B. Measenger, G. T. Bogle, J. S. Clark, F. W. Chesnaye, S. Blake, T. Crawford, L. C. Rivett, A. Denham, F. J. Waldmeier, J. M. Shaw, R. Young, A. W. Laing.

W. R. Rowlands to be temporary Honorary Lieutenant whilst employed with the British Red Cross Hospital, Neyley.

Officers relinquishing their commissions: Temp. Capt. J. W. Hutton, S. A. Montgomery, A. C. Turner, R. A. Hughes, G. J. W. Keigwin, Temp. Lieuts. W. Butement, E. G. Barker, D. H. Foley, E. Beavley, F. D. Crew, G. W. Young, H. Hannigan, H. T. Finlayson, C. H. F. Bailey, R. N. Hartley, J. Porteous, A. J. D. Rowan, T. E. Davey, E. K. Williams, and J. Watt, and W. Leslie (on account of ill-health).

### SPECIAL RESERVE OF OFFICERS.

Lieutenants to be Captains: H. Chadwick, T. O'Mahony, G. G. Drummond.

W. F. Mason, from Leeds Univ. Cont., O.T.C., to be Lieutenant.

Lieutenant on probation D. Stewart is confirmed in his rank.

### TERRITORIAL FORCE.

Capt. (temp. Major) W. D. Watson to be acting Lieutenant-Colonel whilst commanding a Field Ambulance.

Lieuts. A. H. T. Andrew and C. Jephcott to be Captains.

Capt. (temp. Major) C. Corfield relinquishes his temporary rank on alteration in posting.

Lieut. P. W. G. Sargent is seconded whilst holding a temporary commission in the R.A.M.C.

## URBAN VITAL STATISTICS.

(Week ended March 24th, 1917.)

**English and Welsh Towns.**—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18,000,000 persons, the annual rate of mortality was 16·6, against 17·1 and 18·5 per 1000 in the two preceding weeks. In London, with a population exceeding 4,000,000 persons, the death-rate was 17·5, or 1·8 per 1000 below that recorded in the previous week; among the remaining towns the rates ranged from 7·6 in Gloucester, 8·7 in Coventry, and 9·0 in Ilford, to 22·7 in Walsall and in Middlesbrough, 23·2 in Eastbourne, and 23·3 in Gateshead. The principal epidemic diseases caused 381 deaths, which corresponded to an annual rate of 1·1 per 1000, and included 228 from measles, 52 from infantile diarrhoea, 47 from diphtheria, 42 from whooping-cough, 7 from scarlet fever, and 5 from enteric fever. The deaths from measles showed a further increase compared with the numbers recorded in the eight preceding weeks, and caused the highest annual death-rates of 2·2 in Plymouth and in Warrington, 2·4 in Wigan, and 3·4 in Walsall. The 817 cases of scarlet fever and the 1477 cases of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 12 and 1 above the numbers at the end of the previous week. Of the 5496 deaths from all causes in the 96 towns, 166 resulted from violence. The causes of 51 of the total deaths were uncertified, of which 12 were registered in Birmingham, 4 in Manchester, and 3 each in London, Stoke-on-Trent, Liverpool, and Gateshead.

**Scotch Towns.**—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death-rate was equal to 16·2, against 16·7 and 18·3 per 1000 in the two preceding weeks. The 348 deaths in Glasgow corresponded to an annual rate

of 16·3 per 1000, and included 28 from whooping-cough, 13 from measles, 6 from infantile diarrhoea, and 1 from diphtheria. The 117 deaths in Edinburgh were equal to a rate of 18·4 per 1000, and included 7 each from measles and whooping-cough, and 1 from infantile diarrhoea.

*Irish Towns.*—The 201 deaths registered in Dublin were equal to an annual rate of 26·3, or 2·3 per 1000 above that in the previous week, and included 17 from measles, 4 from whooping-cough, and 1 from enteric fever. The 156 deaths in Belfast corresponded to an annual rate of 20·7 per 1000, and included 4 from measles and 3 from infantile diarrhoea.

#### VITAL STATISTICS OF LONDON DURING FEBRUARY, 1917.

In the accompanying table will be found summarised complete statistics relating to sickness and mortality in the City of London and in each of the metropolitan boroughs. With regard to the notified cases of infectious diseases, it appears that the number of persons reported to be suffering from one or other of the ten diseases specified in the table was equal to an annual rate of 4·2 per 1000 of the population, estimated at 4,310,030 persons in the middle of the year; in the three preceding months the rates were 5·0, 3·9, and 4·0 per 1000 respectively. The lowest rates last month were recorded in Kensington, Chelsea, St. Marylebone, Battersea, and Wandsworth; and the highest rates in Paddington, Holborn, the City of London, Shoreditch, and Southwark. The prevalence of scarlet fever showed a slight increase over that recorded in the two preceding months; this disease was proportionally most prevalent in Paddington, Hammersmith, Islington, the City of London, Shoreditch, Bethnal Green, Battersea, and Lewisham. The Metropolitan Asylums Hospitals contained 811 scarlet fever patients at the end of the month, against 1066, 913, and 300 at the end of the three preceding months; the weekly admissions averaged 111 last month, against 95 in each of the two preceding months. The prevalence of diphtheria showed no variation from that recorded in the preceding month; among the various metropolitan boroughs this disease was proportionally most prevalent last month in Holborn, the City of London, Stepney, Southwark, Bermondsey, Deptford, and Greenwich. The number of diphtheria patients under treatment in the Metropolitan Asylums Hospitals, which had been 1543, 1479, and 1420 at the end of the three preceding months, had risen again to 1453 at the end of last month; the weekly admissions averaged 166, against 187, 143, and 168 in the three preceding months. Enteric fever was rather more prevalent than it had been in other recent months; the 35 cases notified during February included 4 in the City of Westminster, 4 in Camberwell, 3 in Paddington, 3 in Kensington, 3 in Stepney, 2 in Fulham, 2 in Bermondsey, and 2 in Wandsworth. There were 29 enteric fever patients under treatment in the Metropolitan Asylums Hospitals at the end of last month, against 37 and 35 at the end of the two preceding months; the weekly admissions averaged 4, against 5 and 6 in the two preceding months. Erysipelas was proportionally most prevalent in Paddington,

Kensington, St. Pancras, Poplar, Southwark, and Woolwich. The 16 cases of puerperal fever notified during the month included 2 in Hackney, 2 in Southwark, 2 in Battersea, and 2 in Woolwich. The 61 cases of cerebro-spinal meningitis included 6 in Islington, 5 in Bethnal Green, 5 in Lambeth, 4 in Southwark, and 4 in Camberwell; while of the 8 cases notified as poliomyelitis 2 belonged to Islington and 2 to Lambeth.

The mortality statistics relate to the deaths of persons actually belonging to the several metropolitan boroughs, the deaths occurring in institutions having been distributed among the several boroughs in which the deceased persons had previously resided. During the four weeks ending March 3rd the deaths of 7039 London residents were registered, equal to an annual rate of 21·3 per 1000; in the three preceding months the rates were 14·5, 22·6, and 18·4 per 1000 respectively. The death-rates during the month ranged from 16·1 in Hampstead, 16·6 in Lewisham, 18·3 in Woolwich, 18·2 in Hackney and in Wandsworth, and 18·9 in Hammersmith, to 23·5 in Kensington, 24·7 in Finsbury, 25·4 in St. Marylebone, 25·6 in Bermondsey, 26·0 in Southwark, and 26·5 in Shoreditch. The 7039 deaths from all causes included 386 which were referred to the principal infectious diseases; of these, 204 resulted from measles, 9 from scarlet fever, 55 from diphtheria, 42 from whooping-cough, 5 from enteric fever, and 71 from diarrhoea and enteritis among children under 2 years of age. No death from any of these diseases was recorded last month in Hampstead or in the City of London; they caused the lowest death-rates in Kensington, Stoke Newington, Finsbury, Lewisham, and Woolwich; and the highest rates in Fulham, St. Marylebone, St. Pancras, Southwark, Bermondsey, Lambeth, and Camberwell. The 204 deaths from measles were 57 above the corrected average number in the corresponding period of the five preceding years; this disease was proportionally most fatal last month in Fulham, St. Marylebone, St. Pancras, Southwark, Bermondsey, and Camberwell. The 9 fatal cases of scarlet fever were only half the average number, and included 2 in Deptford and 1 each in Fulham, Hackney, Shoreditch, Poplar, Southwark, Lambeth, and Wandsworth. The 55 deaths from diphtheria were 4 in excess of the corrected average number; this disease was proportionally most fatal in Hammersmith, Islington, Stepney, Southwark, and Deptford. The 42 deaths from whooping-cough were 72 fewer than the average; the highest death-rates from this disease last month were recorded in Paddington, Islington, Southwark, Lambeth, Battersea, and Wandsworth. The 5 fatal cases of enteric fever showed a decline of 6 from the average number, and included 2 in Stepney and 1 each in the City of Westminster, Hackney, and Battersea. The 71 deaths from diarrhoea and enteritis among children under 2 years of age were slightly fewer than the average; the mortality from this cause was proportionally greatest in Paddington, Chelsea, the City of Westminster, St. Pancras, Islington, Hackney, Shoreditch, and Bermondsey. In conclusion, it may be stated that the aggregate mortality in London during the month from these principal infectious diseases was 7·5 per cent. above the average.

#### ANALYSIS OF SICKNESS AND MORTALITY STATISTICS IN LONDON DURING FEBRUARY, 1917.

(Specially compiled for THE LANCET.)

CITIES AND BOROUGHS.	Estimated civil population, 1915.	Notified Cases of Infectious Disease.										Deaths from Principal Infectious Diseases.												
		Small-pox.	Scarlet fever.	Diphtheria.*	Typhus fever.	Enteric fever.	Other con-tinued fevers.	Puerperal fever.	Erysipelas.	Cerebro-spinal meningitis.	Poliomyelitis.	Total.	Annual rate per 1000 persons living.	Small-pox.	Measles.	Scarlet fever.	Diphtheria.*	Whooping-cough.	Enteric fever.	Diarrhoea and enteritis (under 2 years).	Total.	Annual rate per 1000 persons living.	Deaths from all causes.	Death-rate per 1000 living.
LONDON...	4,310,030	—	440	613	—	35	1	16	202	61	8	1376	4·2	—	204	9	55	42	5	71	386	1·2	7039	21·3
<i>West Districts:</i>																								
Paddington...	131,397	—	18	17	—	—	—	—	13	1	—	52	5·2	—	1	4	—	—	4	9	0·9	222	22·0	
Kensington...	155,795	—	9	13	—	3	—	—	11	2	—	33	3·2	—	4	—	—	1	5	0·4	281	23·5		
Hammersmith...	118,559	—	17	11	—	—	—	—	4	2	—	34	3·7	—	1	—	—	1	7	0·8	172	18·9		
Fulham...	151,161	—	9	24	—	2	—	1	3	3	—	42	3·6	—	15	2	2	2	22	1·9	251	21·6		
Chelsea...	58,421	—	1	4	—	—	—	—	5	2	—	7	1·6	—	4	—	—	1	3	0·7	94	21·0		
City of Westminster	135,104	—	17	12	—	4	—	—	5	2	1	41	4·0	—	4	—	—	1	10	1·0	234	22·6		
<i>North Districts:</i>																								
St. Marylebone...	100,260	—	3	7	—	—	—	—	2	1	—	13	1·7	—	15	—	—	1	1	17	2·2	195	25·4	
Hampstead...	81,763	—	9	7	—	1	—	—	4	1	—	22	3·5	—	6	—	—	1	—	—	101	16·1		
St. Pancras...	209,322	—	12	29	—	1	—	1	14	3	—	60	3·9	—	19	—	2	1	11	33	2·1	350	22·8	
Islington...	316,242	—	44	49	—	—	—	1	16	6	2	118	4·9	—	6	—	7	7	26	1·1	542	22·3		
Stoke Newington...	50,527	—	5	6	—	1	—	—	1	1	1	14	3·6	—	—	—	1	1	2	0·5	79	20·4		
Hackney...	217,883	—	21	26	—	1	1	2	3	—	1	55	3·3	—	1	1	2	1	7	13	0·8	304	18·2	
<i>Central Districts:</i>																								
Holborn...	40,405	—	3	12	—	—	—	—	1	1	—	17	5·5	—	2	—	—	—	—	2	0·6	68	21·9	
Finsbury...	76,915	—	8	9	—	1	—	—	5	1	—	24	4·1	—	3	—	—	—	3	0·5	146	24·7		
City of London...	19,461	—	5	4	—	—	—	—	—	—	—	9	6·0	—	—	—	—	—	—	—	—	33	22·1	
<i>East Districts:</i>																								
Shoreditch...	103,627	—	19	24	—	—	—	—	7	3	—	53	6·7	—	—	1	1	—	3	5	0·6	211	26·5	
Bethnal Green...	120,207	—	17	20	—	1	—	—	6	5	1	50	5·4	—	5	—	1	1	7	0·8	198	21·5		
Stepney...	265,731	—	27	53	—	3	—	—	15	5	—	101	5·0	—	8	—	8	2	5	25	1·2	405	19·9	
Poplar...	156,247	—	7	26	—	1	—	1	14	5	—	52	4·3	—	7	1	1	2	3	13	1·1	241	20·1	
<i>South Districts:</i>																								
Southwark...	179,424	—	13	53	—	—	—	2	18	4	—	90	6·5	—	18	1	5	4	—	2	30	2·2	358	26·0
Bermondsey...	117,188	—	12	26	—	2	—	1	1	1	—	42	4·7	—	12	2	—	5	19	2·1	230	25·6		
Lambeth...	284,188	—	31	44	—	—	—	1	6	5	2	89	4·1	—	20	1	5	5	36	1·7	495	22·7		
Battersea...	161,945	—	24	6	—	1	—	2	5	—	—	38	3·1	—	9	—	1	3	1	15	1·2	263	21·2	
Wandsworth...	312,249	—	29	29	—	2	—	1	5	3	—	68	2·9	—	18	1	1	6	2	27	1·1	437	18·2	
Camberwell...	254,385	—	22	32	—	4	—	1	10	4	—	73	3·1	—	26	1	3	3	1	33	1·7	435	22·3	
Deptford...	110,299	—	14	20	—	1	—	—	41	4·8	—	—	—	—	—	1	2	4	—	7	0·8	169	20·0	
Greenwich...	96,385	—	7	22	—	1	—	1	3	3	—	37	5·0	—	5	—	1	1	7	0·9	148	20·0		
Lewisham...	164,438	—	22	17	—	1	—	—	9	2	—	51	4·0	—	1	—	3	1	1	5	0·4	210	16·6	
Woolwich...	129,505	—	15	11	—	1	—	2	14	2	—	45	4·5	—	3	—	1	1	—	5	0·5	167	16·3	
Port of London...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

\* Including membranous croup.

## Correspondence.

"Audi alteram partem."

### "SOLDIER'S HEART."

*To the Editor of THE LANCET.*

SIR.—Captain Adolphe Abrahams's paper on "Soldier's Heart," published in your issue of March 24th, is one which has interested me very greatly. With many of his points of view I am in entire sympathy; in none more so than when he discusses the effect of strain upon the heart. The inherent improbability that so vital a muscle as that of the healthy heart is materially exposed to damage during physical effort is so obvious that the strongest evidence of such damage must be forthcoming before the hypothesis of strain can become acceptable. There is no doubt in my mind that in a number of the earlier records of dilatation following effort such dilatation resulted from a paroxysm of tachycardia, great acceleration of the heart's action, and acceleration of pathological type; certainly that has been the cause of dilatation in all the cases of so-called strain with sudden dilatation which I have seen. Such paroxysms are unquestionably provoked by effort, but only, I believe, when there is a pre-existing defect in the heart. Amongst a group of 558 cases of so-called "D.A.H." admitted to the Military Hospital, Hampstead, last year the histories associate the onset of the symptoms with sudden effort in five instances only. There can be little disagreement that effort aggravates the symptoms, and that effort displays defects which are latent, but that it is responsible for the condition which Captain Abrahams describes is not to be believed upon the evidence which is before us. Captain Abrahams claims a wide experience of athletes, and his statements in regard to them form a valuable contribution to the subject discussed; he would do all those who are interested in cardiac problems a considerable service if at some future date he would describe his experience at greater length.

When Captain Abrahams states, in discussing the value of murmurs in estimating the soldier's fitness for duty, that the heart's capacity for doing work is the vital criterion our observations at Hampstead bear out his statement completely. In a group of 462 patients at Hampstead 266 were entirely free from cardiac murmurs, while 196 presented systolic murmurs over some valve area. These patients were all classified as to their capacity for duty by testing their tolerance to physical drill and route marches extending over many weeks. Of the 266 presenting no murmur (the controls) 154, or 58 per cent., were considered on the basis of exercise tests to be permanently unfit for duty, while 42 per cent. were returned to duty. Of the 196 men presenting murmurs 101 (or 52 per cent.) were judged on the same basis to be unfit and 48 per cent. returned to duty. The group of cases has been further subdivided according to the situation of the murmur, its conduction, &c., but the balance remains the same between the fit and the unfit—namely, approximately 50 per cent. each way. In a report about to be issued by the Medical Research Committee I have therefore concluded that "the presence or absence of systolic murmurs is of no value in estimating the soldier's capacity for work."

Lastly I come to a statement of Captain Abrahams which concerns a recent publication by myself and co-workers. He states that "Recently 'soldier's heart' has been attributed to deficiency of buffer-salts in the blood." This statement cannot be allowed to pass without correction. In an article written in conjunction with Cotton, Barcroft, and others, our belief is stated that breathlessness may be due to this cause. That is, as I am sure Captain Abrahams will on consideration agree, a different statement from that which he attributes to us. It is true that our conclusion applies to breathlessness as we have seen it in "those who are diagnosed as 'irritable hearts'"; but we nowhere imply that a deficiency of "buffer-salts" is the whole condition, nor do we imply that the same change may not be found in the future in distinct conditions. Neither do we attempt, as may be inferred from Captain Abrahams's article, to ascribe "symptoms of cardiac disease" to a deficiency of these salts. Indeed there is nothing in our article which suggests that we

believe any of the symptoms of the condition discussed emanate from cardiac disease. We deal with one symptom only—namely, breathlessness—and in so far as we deal with this we express the view that it is not cardiac in origin.

I am, Sir, yours faithfully,  
THOMAS LEWIS.

Military Hospital, Hampstead, March 24th, 1917.

## THE MOBILISATION OF THE DENTAL PROFESSION.

*To the Editor of THE LANCET.*

SIR.—The dental profession cannot fail to appreciate the views expressed in the leading article in THE LANCET of March 10th, and let us hope that our authorities will at last see that the best and least expensive manner to meet the needs of the Army is to organise a proper Army Dental Corps as other nations have done. It is quite correct that there are only 5000 qualified men, but it must not be supposed that if all of them were mobilised there would be nobody left to attend to the needs of the community. The bulk of the dental work in England is done by unqualified men, the exact number of whom is unknown, but is sometimes quoted as high as 40,000. These men may not call themselves dentists or dental surgeons, but they are free to practise, for our law does not protect the qualified man nor prohibit the unqualified from practising. The services of these men could not be used in the treatment of the soldiers, but many of them are skilled mechanics, and they could serve in that capacity.

In view of the great shortage of qualified men available for Army service, the first thing to do is to stop the wasteful use of the practitioners who have been drafted into the combatant ranks. Some of them have already been killed, but the remainder should be withdrawn from the ranks and utilised in their own special work.

I am, Sir, yours faithfully,  
F. NEWLAND-PEDLEY.

## SPECIFICITY IN ANTISEPTICS.

*To the Editor of THE LANCET.*

SIR.—There can be no doubt that the question raised by Dr. Kenneth Taylor in your issue of Feb. 24th—namely, that of the specificity of an antiseptic—is an important one, and must be kept in view in dealing with the practical problem of wound treatment. But almost of equal importance is the question of the specificity of the medium for the organism and of the antiseptic for the medium. The specificity of the medium for the organism Dr. Taylor acknowledges, when, for his experiments, he chooses "fluid medium suitable for the organism." If he had employed another medium I feel confident that he would have had very different results.

Regarding the specificity of the antiseptic for the medium, it has been shown that many antiseptics which act well in serum or other media suitable for the growth of organisms become practically inert when they react with pus. For this reason the hypochlorites are practically useless as "dressing solutions" except to ensure asepsis, while as irrigation lotions, when they are in too great bulk to be completely quenched, they appear to be excellent. I would suggest, therefore, that in our experiments on antisepsis we should direct our attention to media as like those in which the organisms thrive in a wound as it is possible to get. Infected pus or blood provides such a medium, for these contain, for practical purposes, all the elements of tissue except the fibrous stroma. If pus is used it should contain one or two organisms per field; if blood is used it should be defibrinated, inoculated with a small volume of a suspension of organisms, and incubated a short time to allow some phagocytosis to take place. Such a blood medium can readily be standardised so as to give comparative results. As in Dr. Taylor's experiment, the inhibiting strength of the antiseptic in such a medium serves well to give an estimate of its potency. It is noteworthy that, as a rule, an antiseptic is more effective if phagocytosis has not been allowed to take place—i.e., when the organisms are in serum.

One other point I would raise. In reference to "physiological treatment" Dr. Taylor, who has already severely

criticised the claims made for hypertonic saline, now describes the application of physiological saline as a method of "passive treatment" and "a purely negative one." He thus shows clearly that he does not agree with the author of physiological treatment who says "that the white corpuscles are carried forward by a chemotactic movement in the direction of the free surface upon which the physiological solution has been imposed." This, and the statements regarding the physical action of hypertonic saline, I have shown to have no sound experimental foundation. If clinically the physiological methods are satisfactory, we are faced by the problem of finding the true explanation.

I am, Sir, yours faithfully,

Warrington, Feb. 23th, 1917.

WM. PARRY MORGAN.

## THE CLOSURE OF COLOTOMY OPENINGS.

To the Editor of THE LANCET.

SIR.—In connexion with Mr. Lockhart-Mummery's paper in your issue of March 10th, and the subsequent correspondence on this subject, I have looked up the statistics of the cases operated upon in the Royal Infirmary, Sheffield, during the years 1906–1916. The method adopted in all but one has been that described by Professor Sinclair White in your issue of March 24th. The one exception was that in which an enterotome was used to destroy the spur. I was resident surgical officer at the time. The special type of instrument was obtained which Mr. Lockhart-Mummery designates as the best, "in which a male blade fits into a double female blade, the blades being of thin steel with a waved edge." The patient developed peritonitis due to sloughing of the gut, and only after a long and anxious convalescence did he recover. Since then the enterotome has not been used in any case.

The number of cases in the period is 38, with one death. I have seen many of these cases subsequently in the out-patient department, and in no case have they complained of a weak spot in the abdominal wall which might necessitate the wearing of a belt. I only know of one of these cases subsequently developing intestinal obstruction. It was due to the gut becoming involved in secondary carcinoma well above the position of the closed colotomy opening. The operation, if done as described by Greig Smith and quoted by Professor Sinclair White, is not regarded by us as one fraught with severe risk to the patient.

From experience in the after-treatment of these cases during the past ten years as a resident officer and otherwise, I know that every endeavour should be made to keep the bowels from acting as long as the comfort of the patient will permit. Mr. Lockhart-Mummery does not state what the subsequent trouble is likely to be if the bowels do not act on the second day after operation. I respectfully suggest that if they are made to act as a routine on the second day, then the number of failures in closing a colotomy opening will be much increased.

I am, Sir, yours faithfully,

ERNEST FINCH,

March 26th, 1917. Assistant Surgeon, Royal Infirmary, Sheffield.

## SIMPLE ULCER OF THE OESOPHAGUS.

To the Editor of THE LANCET.

SIR.—I am interested in Dr. J. B. Christopherson's case of simple ulcer of the oesophagus published in your issue of March 10th. During an experience of 12 years as pathologist to large hospitals I have come across two such cases. In one case which I published in 1912,<sup>1</sup> the ulcer was situated immediately above the cardiac orifice of the stomach, and it ruptured into the mediastinal tissues and then into the left pleura, the man dying from pyopneumothorax. The patient had suffered from gastric disturbance for two years previously. Since then I have had another case, also in a man, who had suffered from gastric pain after food for six years. He developed severe haematemesis two days before death. At the post-mortem, an ulcer one inch in length was found immediately above the cardiac orifice. In addition, there were several cicatrices in the neighbourhood, as in Dr. Christopherson's case. There was a fine cirrhosis of the liver, but no evidence of varicosity of

the oesophageal veins. The vessel opened into was a small one. There were no ulcers in the stomach or duodenum.

I must say that I fail to see the force of Dr. Christopherson's arguments in favour of the condition in his case being due to typhoid fever contracted six years previously. I have never seen typhoid ulceration in such a situation, and it is generally recognised that these oesophageal ulcers probably have a similar origin to the peptic ulcer of the stomach. Glynn<sup>2</sup> has drawn attention to the frequency with which superficial lesions occur in the oesophagus in association with severe vomiting. It may be, therefore, that chronic gastric catarrh associated with vomiting initiates the condition which ultimately leads to ulceration.

I am, Sir, yours faithfully,

Oraigleath, March 22nd, 1917.

JAMES MILLER, M.D.

## THE CRIMINAL LAW AMENDMENT BILL.

To the Editor of THE LANCET.

SIR.—This Bill is at present being discussed by a committee of the Commons, and the consideration of Clause 2 has been postponed. As readers may be aware, this clause proposes a penalty up to 24 months with hard labour if a venereal person has sexual relations—provided he shall not be punished if he or she has "reasonable grounds" for believing that he or she is free from venereal.

In connexion with this proviso, would it not be well if a clause were added that any doctor receiving a written report from a bacteriologist relating to a blood, pus, or tissue test must retain such report, and must not hand it to a patient? Now, if some 6 to 10 millions of venereals get a hold of such reports and show them to persons immediately concerned much evil may be caused; there could be a good market with pros. and semi-pros. of these. Also a penalty should be provided against such sales, transfers, loans, and otherwise. I am, Sir, yours faithfully,

Liverpool, March 18th, 1917. ROBERT R. RENTOUL, M.D.

PS.—Is it too late to hope that all the clauses relating to brothel-keeping, soliciting, indecent assault, rape, &c., be deleted from this Bill, and that it be made a Public Health Act, relating to venereals only?

## ECONOMY IN RUBBER GLOVES.

To the Editor of THE LANCET.

SIR.—Some years ago I used myself to repair my car tyres by vulcanisation, and being struck by the waste of punctured and torn rubber gloves at a local hospital I was led to experiment in the repair of these gloves by vulcanisation. In course of time I elaborated a suitable electric vulcaniser, and approached some surgical-instrument firms with the idea of putting it on the market. Technical difficulties intervened, however, and it was found to be more convenient to get a firm of repute to undertake the repairs with the apparatus.

For several years now many hospitals, military and civil, have effected a considerable saving, perhaps as high as 50 per cent., in their glove bill by this means. As a big hospital may spend £100 or more a year on gloves, it is obvious that here to hand is a ready means of effecting economy with no loss of efficiency. The repairs thus effected have the following advantages over patches simply stuck on with rubber solution: 1. The patches are so small as to be almost impalpable. 2. They do not come off, even after repeated sterilisations. 3. A new finger can be put on a glove; for instance, the right forefinger of a glove is often lacerated badly and needs renewal. 4. A long slit can be repaired, or a new wrist affixed, or two lacerated gloves made up into one good one.

The repairs are undertaken by Messrs. W. and A. Bates, Rubber Mills, Leicester.—I am, Sir, yours faithfully,

N. I. SPRIGGS, M.D. Lond., F.R.C.S. Eng.,  
Leicester, March 26th, 1917. Captain, R.A.M.C. (T.).

<sup>1</sup> Proceedings of the Pathological Society of Great Britain and Ireland, 1914.

THE Wounded Allies Relief Committee, 8, Grosvenor-gardens, S.W., has presented to the Serbian Relief Fund the sum of £500, to be spent exclusively on providing food for sick and wounded Serbian prisoners of war in Germany.

# The War.

## THE CASUALTY LIST.

The following names of medical officers appear among the casualties announced since our last issue:—

### Killed.

Capt. W. B. Clark, R.A.M.C., attached Scots Guards, was a student at King's College Hospital, and qualified in 1903 at London University. He joined the R.A.M.C. in October, 1914, and was killed by the bursting of a shell whilst doing duty with the Scott Guards.

Capt. E. Robinson, R.A.M.C.

### Wounded.

Capt. A. F. Wilson, R.A.M.C., attached York and Lancaster Regiment.

Capt. W. B. Purchase, R.A.M.C., attached Royal Field Artillery.

Capt. F. G. Thatcher, R.A.M.C.

Capt. P. S. Blaker, R.A.M.C.

Capt. E. H. Moore, D.S.O., R.A.M.C.

## THE HONOURS LIST.

The following awards to medical officers are announced:—

### Distinguished Service Order.

Temp. Surg. Harold Boulbee Padwick, R.N.

For conspicuous gallantry and devotion to duty. He remained in the open, and continued to tend the wounded under very heavy fire. Later, he proceeded to Headquarters, and at great personal risk brought in many wounded men. He displayed great courage and determination throughout the operations.

### Bar to Military Cross.

Temp. Capt. Archibald Stirling Kennedy Anderson, M.C., R.A.M.C., attached R.N. Field Ambulance.

For conspicuous gallantry and devotion to duty. He rendered most valuable services while in command of a bearer subdivision, in assisting to collect wounded from a forward area under very heavy fire. (The award of the Military Cross was announced in THE LANCET of Sept. 2nd, 1916, p. 450.)

### Military Cross.

Temp. Lieut. Herbert John Davidson, R.A.M.C., attached R.N. Field Ambulance.

For conspicuous gallantry and devotion to duty. He tended the wounded in a forward area under very heavy fire. He set a splendid example to all ranks.

Capt. Robert Andrew Kerr, R.A.M.C., attached Royal Warwickshire Regiment.

For conspicuous gallantry and devotion to duty. He succeeded in rescuing his three bearers, who were entombed when the aid-post was blown in. He constantly visited the most dangerous parts of the line in order to tend the wounded.

Temp. Lieut. Allan George Reid, R.A.M.C., attached R.N. Field Ambulance.

For conspicuous gallantry and devotion to duty. He tended the wounded under very heavy fire, and worked continuously for 36 hours in command of a bearer subdivision which was operating in a forward area.

Capt. Norman Craig Shierlaw, Australian A.M.C., R.M.C., Australian Infantry.

For conspicuous gallantry and devotion to duty. He continually attended to the wounded for two days and nights under heavy fire. He has on many previous occasions done fine work.

**Foreign Decoration.**—The President of the French Republic has conferred the Croix de Guerre avec Palme upon Surgeon J. D. Milligan, R.N.

The name of Surgeon J. D. Milligan is also mentioned in a despatch dealing with naval matters.

## DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

Second Lieut. J. H. Cotterill, Black Watch, youngest son of Lieut.-Col. J. M. Cotterill, R.A.M.C., of Edinburgh.

Second Lieut. R. M. Ross, Worcestershire Regiment, youngest son of Dr. D. M. Ross, of Brighton.

Capt. W. B. Clark, R.A.M.C., younger son of Dr. G. B. Clark, formerly M.P. for Caithness.

Capt. E. P. Turner, Royal Field Artillery, younger son of Surgeon-General G. R. Turner, of Radlett, Herts.

## HOSPITAL SHIP TORPEDOED.

The British hospital ship *Asturias* was torpedoed without warning on the night March 20th-21st. She had previously landed about 900 sick cases. The casualties amongst the medical services included 11 dead, 3 missing (including 1 female staff nurse), and 17 injured. Between 300 and 400 survivors were landed; some were injured by the explosion and 3 died after being landed.

**WAR HOSPITAL WORK IN HAMPSHIRE.**—A meeting under the auspices of the British Red Cross Society was held at Winchester on March 21st. The county director, Mr. Lockhart Stephens, reported that there were in Hampshire 53 auxiliary hospitals, 9 of which were under the control of the Order of St. John, 33 under the Red Cross Society, and the remainder promoted and largely maintained by private individuals. The accommodation was about 2000 beds, and in response to the official appeal for expansion it was hoped that an additional 1344 beds would be provided within a few weeks. The number of Red Cross detachments in the county was between 60 and 70, with a membership of 1869, of whom 1049 were on actual V.A.D. service, and 186 were working in military or naval hospitals. Upwards of 400 members had enrolled under the general service scheme. No less than 45 women had almost completed their training as stretcher-bearers, when they would release men at Netley Hospital for other work. About 150 men, unfit for military service, were relieving the disembarkation staff at Southampton.

**THE TRAINING OF THE DISABLED SOLDIER.**—The statement of Mr. Barnes in the House of Commons recently, on which we commented in our issue of March 17th, adds interest to an account of the training in the Queen Mary's workshops at the Pavilion Military Hospital, Brighton, which appears in the organ of that hospital, *The Pavilion Blues*, for March. After an experience of six months Mr. A. G. Baker, the superintendent of trades instruction, speaking of the maimed sailor and soldier, is convinced that many of these men may by suitable training be enabled to take their place as self-dependent citizens, if only they will give up a little of their spare time. The workshops are run on entirely voluntary lines, no other inducement being offered to attract the men than self interest. Strict discipline is enforced, and each student is expected to attend as regularly as medical treatment will permit, yet the conduct of the students has left nothing to be desired, while many of those who have obtained remunerative work have expressed their gratitude for the training received. This at present comprises commercial training, woodwork, elementary electricity, and motor engineering. Her Majesty the Queen has signified her intention of bearing the cost of a new building to which it is proposed to transfer the commercial training classes, and in their place it is proposed to instal leather trades and possibly tailoring. The field of selection has been widened by the co-operation of the headmaster of the School of Art, Brighton, and the principal of the Technical School. The workshops, which are registered under the new Act, rely upon voluntary contributions for their main support.

**MILITARY HOSPITAL MAGAZINES.**—The *Bulletin*, the official organ of the Third Western General Hospital (Cardiff, price 3d.) makes its first appearance, and as its contemporaries have done, prints accounts of the social activities of the hospital whence it emanates, with portraits of the staff and articles and illustrations, humorous and otherwise, of a topical nature. It is well printed and we wish it success, for the sales of these journals benefit those to whom the hospitals minister. The current issue of the *Ration*, the magazine of the Reading War Hospitals (Reading, price 2d.), maintains a good reputation, especially on the illustrative side, while the March issue of the *Craigleath Hospital Chronicle*, the organ of the Second Scottish General Hospital (Edinburgh, price 6d.), has among its contents a readable account of the Scottish Soldier of Fortune and the continuation of the story of the Gordon Highlanders.

## Obituary.

### JOHN MORTIMER, M.B. LOND., M.R.C.S. ENG., CONSULTING SURGEON, EXETER DISPENSARY.

Mr. J. Mortimer, who died at his residence in Exeter on March 9th, was the fourth son of the late Mr. W. Mortimer, J.P., of Exeter. He received his medical education at University College Hospital, London, taking his M.R.C.S. in 1876, and in 1877 graduated M.B. of London University. Mr. Mortimer practised in Exeter for many years, where he was highly respected. He was consulting surgeon to the Exeter Dispensary and on the honorary consulting staff of the Devon and Exeter Dental Hospital. He was also examining medical officer to the Devon Constabulary. At the commencement of the war he was attached to the Southern General Hospital, with the rank of Major, R.A.M.C. (T.F.), but ill-health compelled him to resign the appointment last year.

### ARTHUR EDWARD PERMEWAN, M.D. LOND., M.R.C.S., L.S.A., D.P.H. CANTAB., J.P.

Dr. A. E. Permewan died at his residence in Redruth, Cornwall, on March 21st, after a short illness. The deceased was a son of the late Dr. J. Permewan, of Redruth, and received his medical education at University College Hospital, graduating as M.D. London in 1883. He succeeded to his father's practice about 20 years ago and held numerous appointments, being surgeon to the Redruth Miners' Hospital, medical officer for the Redruth district, and medical officer of health for the Redruth rural district. For several years he was a member of the Redruth urban council and was a former chairman of that body. He was a member of the Cornwall Insurance Committee and a magistrate of the county of Cornwall. Dr. Permewan was held in much respect in Redruth and the district, and much sympathy is felt locally for his family.

## Medical News.

### UNIVERSITY OF DURHAM, FACULTY OF MEDICINE.—At the Second Examination for the degree of Bachelor of Medicine held recently the following candidates were successful:

*Anatomy and Physiology.*—Edgar Frederick Herbert Bell, Robson Christie Brown (second-class honours), Nan Coxon, Samuel Whately Davidson, Mark Julius Erberg, Alfred Stoddart Graham, Hamid Kamel, Malik Abdur Rahman Mansoor, Thomas Norman Vickers Potts, and May Raw.

### UNIVERSITY OF MANCHESTER.—At the examination for the Diploma in Public Health held recently the following candidates were successful:

T. C. Mackenzie and S. N. Mitra.

### UNIVERSITY OF LIVERPOOL.—At the examination for the degrees of Bachelor of Medicine and Bachelor of Surgery, held recently, the following candidates were successful:

Mikhail Azer, Constance Maude Edwards, Shaikh Mohamed Afzal Faruqi, Austin Jewkes Barlow Griffin, Isaac Jacob Lipkin (second-class honours), Robert Nixon, Charles Victor Pearson, Paul Barrar Pinkerton (second-class honours), Eric Strawson Stubbs (first-class honours), and Rattan Chaud Watts.

### QUEEN'S UNIVERSITY OF BELFAST.—At examinations held recently the following candidates were successful:

#### M.C.H. EXAMINATION.

John W. West.

#### M.B., B.C.H., AND B.A.O. EXAMINATION.

Joseph Adams, William L. Agnew (second-class honours), Samuel T. Alexander, Patrick Clarke, John H. Davison, William Harvey (second-class honours), James H. B. Hogg, Louis Jefferson, Robert N. B. McCord (first-class honours), William C. McCullough, Patrick J. McSorley, John Scott (second-class honours), and John Wilson (second-class honours).

#### THIRD MEDICAL EXAMINATION.

*Pathology and Materia Medica.*—John Barron, David Cromie, Thomas Dickey, Charles W. A. Emery, Stewart Fullerton, John Grimdon, Robin Hall, Samuel Hall, John M. Hosey, Joseph G. M. Leyden, William Napier, Jeremiah O'Kane, John B. Rea, and Andrew Watson.

*Materia Medica.*—Samuel Acheson, Thomas G. Campbell, Alfred E. Gallaher, Arthur H. Henry, George D. F. McFadden, William Michael, Hugh Paul, Henry Poston, Louis P. St. J. Story, Percival S. Walker, and Thomas Wallace.

#### *Pathology.*—Ruth M. Slade.

*Medical Jurisprudence and Hygiene.*—Crawford Blair, Thomas J. A. Connolly, David Cromie, Thomas Dickey, Daniel J. McDermott, Robert Nimmons, Charlotte Peplow, and Andrew Watson.

*Hygiene.*—Samuel Acheson, Thomas G. Campbell, Alfred E. Gallaher, Arthur H. Henry, George D. F. McFadden, William Michael, Hugh Paul, Henry Poston, Louis P. St. J. Story, and Percival S. Walker.

#### SECOND MEDICAL EXAMINATION.

*Anatomy and Physiology.*—Winifred W. Boland, Reginald N. Deane, Robert Duncan, David W. J. Gray, James S. F. J. Kerr, and Leonard G. Morrison.

*Anatomy.*—Helen M. Murnane.

#### D.P.H. EXAMINATION.

Mary G. Caskey and David L. McCullough.

### UNIVERSITY OF ABERDEEN.—At the graduation ceremony on March 23rd the following degrees were conferred:

*Doctor of Medicine (M.D.).*—James Clark Bell (honours for thesis) and George Riddoch (honours for thesis).

*Bachelor of Medicine (M.B.) and Bachelor of Surgery (Ch.B.).*—Wm. Francis Whitaker Bettsen, James Sutherland Balkwill Forbes,

\*Richard Ramsay Garden, \*Archibald Clive Irvine, \*Alex. Gow Lumden (second-class honours), Wm. Calthorpe MacKinnon, \*George Reid McRobert (second class honours), Charles Gordon Shaw Milne, Maggie Jane Moir, M.A., James Macdonald Morrison, Wm. Wyness Nicol, Frank Miller Rorie, Charles Shearer, Arthur Percy Spark, Robert Thom, Thomas David Watt, Jean Ordgarff Yule, and Vincent Thomas Borthwick Yule.

\* Passed Fourth Professional Examination with much distinction.

† Passed Fourth Professional Examination with distinction.

### THE RÖNTGEN SOCIETY.—The general meeting of this society, to be held at the Cancer Hospital on April 3rd, at 8.15 P.M., will be followed by a discussion on the Future of the British X Ray Industry, opened by Mr. Geoffrey Pearce, in which Sir J. Mackenzie Davidson, Professor A. W. Porter, F.R.S., Major Wilson, C.A.M.C., Dr. C. R. C. Lyster, and others will take part.

### DOCTORS OF MILITARY AGE: THE SQUABBLE AT OMAGH.—A correspondent writes: "The never-ending squabble about doctors of military age continues at Omagh, co. Tyrone. The latest phase has arisen from the fact that the Local Government Board refused to sanction payment, on the ground that he was of military age, to the doctor who has been doing duty for Dr. D. F. Murnaghan during the latter's illness. On March 24th, at a meeting of the Omagh guardians, it was, however, decided by 27 votes to 23 to pay the locum-tenant's account, £31 10s., and it remains to be seen what will be the final action of the Local Government Board on this disputed matter."

### THE HEALTH OF THE UNITED STATES ARMY.—The report of the Surgeon-General of the United States Army for 1916 dealing with the calendar year 1915 shows that the general health of the troops during that period was excellent, a matter which to-day assumes an importance quite outside its sanitary bearing. The number of men composing the army was approximately 100,000, distributed in varying numbers over a wide geographical area—namely, from the 66th meridian W. longitude to the 115th meridian east of Greenwich, and from the 64th degree N. latitude to within seven degrees of the equator, thus giving the medical officers in their capacity of sanitary advisers to the line an opportunity of studying the recent advances of modern preventive medicine under the most varied conditions. The non-effective rate for the entire army from disease alone was 20.85 per 1000, while from all causes it was 25.22, or a rate slightly higher than that for 1914, though still much below the rate for any preceding year except 1913, when it was 23.98. The death-rate of the entire army from all causes was 4.45, that from disease being 2.53. The discharge-rate from all causes was 14.06. Malarial fevers showed the lowest non-effective rate in the history of the army—namely, 0.54—the record in the Philippines being specially creditable as compared with former years. There were 8 cases of typhoid fever in the entire army with no deaths, all making good recoveries. Tuberculosis showed an admission rate of 3.49. In regard to venereal diseases, which in all countries are a very serious factor against military efficiency, it is pointed out that the measures adopted by the United States Army to limit its ravages include regular medical examination twice a month, prompt isolation, quarantining and hospital treatment, other measures being court-martial and stoppage of pay. Opportunities for study and sport, together with good food and clothing, have their influence, while earnest appeals are made on moral and ethical grounds. The admission rate for these diseases was 83.60 as compared with 89.84 in the previous year. The non-effective rate was considerably higher in 1915 than in 1914. Alcohol, which was banished from the garrisons, camps, and the navy before the war, says the Surgeon-General, must hereafter be held unqualifiedly antagonistic to military efficiency. The admission and non-effective rates for alcoholism have shown a steady decline, keeping pace with general public sentiment and the decreased use of stimulants in all walks of life in the United States.

## Parliamentary Intelligence.

### NOTES ON CURRENT TOPICS.

#### Criminal Law Amendment Bill.

THE Standing Committee of the House of Commons, to which the Criminal Law Amendment Bill has been referred, further considered it on Thursday, March 22nd.

Clause 7 extends the Indecent Advertisements Act, 1889. One of the provisions in the clause substitutes the following section for Section 5 of the principal Act:—

Any advertisement relating to syphilis, gonorrhoea, nervous debility, or other complaint or infirmity arising from or relating to sexual intercourse, and any advertisement which suggests, directly or indirectly, the use or taking of any appliance, drug, substance or thing, for the purpose of procuring miscarriage or abortion, or which suggests, directly or indirectly, that any premises are or can be used for immoral purposes, shall be deemed to be printed or written matter of an indecent nature within the meaning of Section 3 of this Act.

In the course of the discussion of this provision objection was taken to the wording on the ground that nervous debility in some cases arose from overwork and other causes with which the Bill was not intended to deal. A slight alteration was accordingly made in the text with the intention of making it clear that the complaints and infirmities enumerated were only those "arising from or relating to sexual intercourse." A proposal was made to include amongst the penalised advertisements those which suggested the use of any appliance, drug, substance, or thing, for the purpose of preventing conception. On it being pointed out that such a provision might overload the Bill and give rise to some opposition it was withdrawn.

The consideration of Clause 7 was resumed on Tuesday, March 27th.

An amendment was introduced making it punishable to issue an advertisement "which offered to give advice" relating to miscarriage or abortion.

Mr. GLYN-JONES moved as an amendment the insertion of the following subsection:—

Any person who holds out or recommends to the public by any public notice or advertisement, or by any written or printed papers or handbills, or by any label or words written or printed affixed to or delivered with any packet, box, bottle, phial, or other inclosure containing the same, any pills, powders, lozenges, tinctures, potions, cordials, electuaries, plasters, ungents, salves, ointments, drops, lotions, oils, spirits, medicated herbs and waters, chemical and officinal preparations whatsoever to be used or applied externally or internally as medicines or medicaments for the prevention, cure, or relief of any venereal disease, shall be guilty of an offence under Section 3 of The Indecent Advertisements Act, 1889. Provided that regulations may be made providing for the publishing or notification of the therapeutic properties and uses in connexion with the treatment of venereal diseases of any drug, medicine, or appliance in such manner and to such persons as the Local Government Board may direct.

The honourable Member said that it was the view of pharmaceutical chemists that the subject would not be sufficiently covered without this provision. At first Sir GEORGE CAVE was disinclined to accept the amendment, because he thought it would go too far. After some discussion he agreed to consider the matter before the Report Stage, and to take advice on it. In withdrawing the amendment, so far as the present stage was concerned, Mr. GLYN-JONES observed that if restrictions were to be put on advertisements of this kind, these restrictions must, in the interests of the honest trader, be made watertight.

Clause 7 went on to provide that—

Nothing in the Indecent Advertisements Act, 1889, as amended by this Act, shall apply to any advertisement by any local or public authority, or to any advertisement published in any bona fide medical or pharmaceutical publication or pharmaceutical trade list; and a person charged under that Act as so amended with publishing an advertisement, if he is not himself the advertiser, shall not be convicted if he proves that he did not know, and had no reasonable ground for suspecting, that the advertisement was of such a character as to make the publication thereof an offence.

Mr. GLYN-JONES moved as an amendment to strike out the greater part of this provision and to substitute words so that it should read:—

Nothing in the Indecent Advertisements Act, 1889, as amended by this Act, shall apply to any advertisement by any local or public authority, or to any advertisement the publication of which has been authorised in writing by the President of the Local Government Board or by one of His Majesty's Secretaries of State.

He said that he doubted whether anyone could give a good definition of what was a bona fide medical or pharmaceutical publication. He feared that if a person was infected with one of the complaints with which the Bill dealt he might turn to medical journals, where remedial preparations were advertised.

Mr. KING and several other Members expressed the opinion that in the matter of making known research work the provisions of the clause might operate in giving a monopoly to the medical profession.

Sir GEORGE CAVE said that the whole purpose of these provisions was to prevent public advertisements of information dealing with this subject being addressed to ignorant people. It was not desired to prevent bona fide inventors bringing remedies to the notice of qualified men.

Mr. DILLON: How do you propose to prevent the ignorant public having recourse to medical journals?

Sir GEORGE CAVE: I agree there is that risk, but I do not think the man in the street does buy THE LANCET or will buy it for this purpose. The danger was from advertisements in daily and weekly papers of quack remedies, which the sufferer used instead of going to consult a medical man. It would be a novel and undesirable plan to entrust the censoring of these advertisements to a Government department. He would, however, see his advisers as to whether there should be some provision against abuse in medical and pharmaceutical publications.

Mr. H. SAMUEL suggested that circularising should be substituted for advertisements.

Sir GEORGE CAVE promised to give careful consideration to the suggestions which had been brought forward.

The amendment was withdrawn and the clause as amended was agreed to.

#### Military Service (Review of Exceptions) Bill.

Mr. MACPHERSON, the Under Secretary for War, has introduced in the House of Commons a Bill "to enable the exception from Military Service of men excepted on the ground of previous rejection, or the previous relinquishment of, or discharge from, Naval or Military Service, or unsuitability for Foreign Service, to be reviewed." It has been read a first time.

#### HOUSE OF COMMONS.

WEDNESDAY, MARCH 21ST.

#### Commissioned Dental Surgeons.

Mr. MACPHERSON (Under Secretary for War) informed Sir Charles Seely that the number of commissioned dental surgeons in the Army was 454.

#### Classification of Men in the Army.

Speaking in Committee of Supply on Army Estimates, Mr. MACPHERSON said: I pointed out on a previous occasion that the accuracy of the examinations of the Royal Army Medical Corps and the various medical corps was an astonishing fact. It is the intention of the War Office—whether it will be carried into effect or not—to alter the classification of men. At present we have Class A, Class B, and Class C, and the various sub-classes in each of those categories. I understand that the proposal is now in favour at the War Office to alter the categories to two distinct ones—Class A and Class B. Class A will be very likely the class fit for general service and Class B those not fit for general service. At the present time I confess we have sent men of Class C 1 and C 2, who are supposed to be men to be utilised for labour at home, to France, but I understand that in each individual case a medical re-examination has taken place, and I understand that the medical authorities have given it as their opinion that the climatic conditions are in no way better and in no way worse here than in Northern France. I do not understand that, so far, any man in Class C 1 or Class C 2 has been sent to any theatre of war except Northern France.

THURSDAY, MARCH 22ND.

#### Poisoning Wells on Western Front.

Replying to Mr. BROOKES, who asked whether the War Office was in possession of any authenticated cases of water poisoning by Germans during the present operations on the Western front, Mr. MACPHERSON wrote: An official report has been received that the wells at Barleux, three miles south-west of Péronne, were examined and found to have been poisoned with arsenic.

MONDAY, MARCH 26TH.

#### Infantile Death-rate.

Answering Mr. O'GRADY, who put a question respecting the decline in the infantile death-rate to 91 per 1000 registered births, Mr. HAYES FISHER (Secretary to the Local Government Board) said: There is no foundation for the suggestion that the decline in the infant death-rate is due to the decline in the number of children who are vaccinated. The lower death-rate is not confined to districts in which vaccination is neglected, and at least one-half of the infants die before the age at which vaccination is usually performed. The decline in the infant death-rate is no doubt due to a number of causes, one of the most important of which is the valuable work which is now undertaken by local authorities and voluntary agencies for attending to the health of mothers and infants.

TUESDAY, MARCH 27TH.

#### Abdominal Operations at the Front.

Sir W. COLLINS asked the Under Secretary of State for War whether, having regard to the more mobile character

of the operations on the Western front and with a view to the earliest possible treatment of certain classes of wounds, especially those of the abdomen, the Army Medical Department was considering the desirability of using motor operating-theatres, similar to those supplied by the Wounded Allies Relief Committee to the Belgian and Italian armies.—Mr. MACPHERSON wrote in reply: The more mobile character of the operations on the Western front has been duly anticipated and the full equipment for an operating theatre, together with the temporary theatre itself, can be sent to the front with the personnel of a casualty clearing station wherever it is required in any part of the line.

## Appointments.

*Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

- BURNS, NEBBIT O'DELL, B.A., M.B., B.Ch., B.A.O. Dub., has been appointed Medical Officer and Public Vaccinator for the Huntspill District by the Bridgwater (Somerset) Board of Guardians.  
 EDWARDS, CHARLES, M.R.C.S., L.R.C.P. Lond., Medical Officer of Health for Bridport.  
 FELTHAM, H. G., M.B., Ch.B. Edin., Medical Officer of Health for the Port of Immingham, Grimsby.  
 VAN INGEN, MARY A., M.B., B.S. Lond., and TRACEY, VIOLET M., L.R.C.P., L.R.C.S. Edin., L.R.F.P.S. Glasg., Medical Inspectors of Public Health Department of L.C.C.  
 KEMP, C., M.B., C.M. Aberd., Certifying Surgeon under the Factory and Workshop Acts for the Morrison District of the County of Glamorgan.  
 KIRKMAN, ALBERT HENRY BRAUMONT, F.R.C.S. Edin., M.R.C.S., L.R.C.P. Lond., Medical Officer and Public Vaccinator for the Branscombe District by the Honiton (Devon) Board of Guardians and Medical Officer and Public Vaccinator for the Axminster (Devon) District of the Axminster Union.  
 POOLER, H. W., M.B., Ch.B., Medical Officer to Clay Cross, Grassmoor, Shirland, Somercotes, and Stonebroom Infant Welfare Centres, Derbyshire Education Committee; and District Medical Officer of the Chesterfield Union.  
 ROWLANDS, W. R., M.R.C.S., L.R.C.P., Medical Officer to the British Red Cross Hospital, Netley.  
 SHANNON, EDITH, M.B., Ch.B. Glasg., Resident Assistant Medical Officer at the West Ham Board of Guardians' Sick Home.  
 TOTTE, EDWIN JOSIAH, M.D., B.Sc. Lond., F.R.C.S. Eng., L.R.C.P. Lond., Acting Deputy Medical Officer of Health for Bideford (Devon).

## Vacancies.

*For further information regarding each vacancy reference should be made to the advertisement (see Index). When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.*

- BIRMINGHAM CITY EDUCATION COMMITTEE.—Temporary Assistant School Medical Officer. Salary £300 per annum.  
 BIRMINGHAM GENERAL DISPENSARY.—Resident Medical Officer, unmarried. Salary £300 per annum, with apartments, &c.  
 BIRMINGHAM AND MIDLAND EYE HOSPITAL.—Female House Surgeon. Salary £200 per annum.  
 BLACKPOOL, VICTORIA HOSPITAL.—House Surgeon. Salary £250 per annum, with board, &c.  
 BODMIN, CORNWALL COUNTY ASYLUM.—Female Junior Assistant Medical Officer. Salary £200 per annum, with board, &c.  
 BOLTON INFIRMARY AND DISPENSARY.—Senior House Surgeon. Salary £230 per annum, with board, &c.  
 BRISTOL ROYAL HOSPITAL FOR SICK CHILDREN AND WOMEN.—Female House Surgeon. Salary £150 per annum, with board, &c.  
 BRISTOL ROYAL INFIRMARY.—House Physician and House Surgeon. Salary at rate of £120 per annum, with board, &c.  
 BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.  
 BURY ST. EDMUND'S, SUFFOLK HOSPITAL, ANPTON HALL.—Resident Medical Officer. Salary £400 per annum, with board, &c.  
 CHARING CROSS HOSPITAL.—Resident Casualty Officer. Salary £100 per annum, with board.  
 CUMBERLAND, COUNTY OF.—Female Assistant Medical Officer. Salary £350 per annum.  
 DURHAMSHEIRE SANATORIUM FOR TUBERCULOSIS, WALTON-LANE, NEAR CHESTERFIELD.—Assistant Medical Officer. Salary £300 per annum, with board, &c.  
 DEVONPORT, ROYAL ALBERT HOSPITAL.—Assistant House Surgeon, unmarried. Salary £150 per annum, with board, &c.  
 EDINBURGH, ROYAL ASYLUM, MERRINGSTIDE.—Temporary Assistant Physician. Salary £265 per annum, with board, &c.  
 GENERAL LYING-IN HOSPITAL, YORK-ROAD, S.E.—Resident Medical Officer for three months. Salary £100 per annum, with board.  
 GUY'S HOSPITAL, S.E.—Female Clinical Assistant in the Venereal Department. Salary 1 guinea per session.  
 HAMPTON GENERAL HOSPITAL, HAVERSTOW HILL.—Casualty Officer for Out-patients' Department. One whole time, salary at rate of £160 per annum, with board; or two half-time at rate of £75 per annum each, lunch and tea provided.

- HARROGATE INFIRMARY.—Resident House Surgeon.  
 HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, BROMPTON.—House Physician for six months. Salary 30 guineas.  
 LEEDS PUBLIC DISPENSARY.—Second Female Resident Medical Officer. Salary £200 per annum, with board, &c.  
 LONDON TEMPERANCE HOSPITAL, HAMPSTEAD-ROAD, N.W.—Assistant Resident Medical Officer. Salary £120 per annum, with board, &c.  
 MANCHESTER CORPORATION.—Assistant Tuberculosis Officer. Salary £350 per annum.  
 MANCHESTER, CRUMPSALL INFIRMARY, CRESCENT-ROAD, CRUMPSALL.—Locum Assistant Resident Medical Officer. Salary £8-8s. per week, with board, &c.  
 MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, PARK-PLACE, CHEETHAM HILL-ROAD.—House Surgeon. Salary £150 per annum, with board, &c.  
 NEWCASTLE UPON-TYNE EDUCATION COMMITTEE.—Temporary Assistant School Medical Officer. Salary £300 per annum.  
 NORTHAMPTON GENERAL HOSPITAL.—Three House Surgeons. Salary £150 per annum each, with board, &c.  
 PECKHAM HOUSE ASYLUM, 112, PECKHAM-ROAD, S.E.—Medical Officer.  
 PORTSMOUTH COUNTY BOROUGH.—Tuberculosis Officer. Salary at rate of £500 per annum.  
 QUEEN MARY'S HOSPITAL FOR THE EAST END, STRATFORD.—House Surgeon.  
 QUEEN'S HOSPITAL FOR CHILDREN, HACKNEY-ROAD, BETHNAL GREEN, E.—Temporary Anaesthetist. Also House Physician, Casualty House Surgeon, and House Surgeon for six months. Salary £100 per annum, with board, &c.  
 READING RURAL DISTRICT COUNCIL.—Medical Officer of Health. Salary £100 per annum.  
 ROCHESTER, ST. BARTHOLOMEW'S HOSPITAL.—Clinical Assistant. Salary at rate of £110 per annum, with board, &c.  
 MOTHERHAM HOSPITAL.—Junior House Surgeon. Salary £250 per annum, with board, &c.  
 ROYAL FREE HOSPITAL, GRAY'S INN-ROAD, W.C.—Two House Physicians and Two House Surgeons. Salary £250 per annum, with board, &c. Also Junior Obstetric Assistant. Salary £22 per annum, with board, &c.; also care of 16 beds at Endleigh Maternity Hospital. Salary given. Also Assistant Anaesthetist. Salary £93 per annum. Also Female Senior Obstetric Assistant. Salary £23 per annum, with board, &c. Also to attend at Endleigh-street Maternity Hospital. Salary £60 per annum.  
 SHEFFIELD ROYAL INFIRMARY.—House Physician. Salary £120 per annum, with board, &c.  
 STOKE-ON-TRENT COUNTY BOROUGH.—Temporary Tuberculosis Officer. Salary £500 per annum.  
 WHITEHAVEN AND WEST CUMBERLAND INFIRMARY.—Resident House Surgeon. Salary £120 per annum, with board, &c.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Lydd (Kent) and Robertsbridge (Sussex).

THE Secretary of State for the Home Department, Whitehall, S.W., gives notice of a vacancy for a Medical Referee under the Workmen's Compensation Act, 1906, for the Sheriffdom of The Lothians and Peebles, to be attached more particularly to the county of Midlothian. Applications should be addressed to the Under Secretary, Scottish Office, not later than April 15th.

## Births, Marriages, and Deaths.

### BIRTHS.

- ALEXANDER.—On March 20th, at Castle House, Riverhead, Sevenoaks, the wife of J. Finlay Alexander, M.A., M.D. Camb., of a son.  
 LAWSON.—At a private nursing home, Maribank, Dundee, the wife of Captain James Lawson, R.A.M.C.—a daughter.  
 QUACKENBOS.—On March 26th, at U.C.H., London, the wife of Maxwell Quackenbos, M.R.C.S., of a son.  
 SAUNDERS.—On March 25th, at Brown-street, Salisbury, the wife of L. Dimock Saunders, M.R.C.S., of a son.  
 SMEED.—On March 22nd, at Springfield, Netley, Hants, to Mildred, the wife of Captain Edward Smeed, R.A.M.C. (T.F.), a daughter.  
 WOOLLEY.—On March 22nd, at Lucknow, the wife of Lieutenant-Colonel J. Maxwell Woolley, I.M.S., of a son.

### MARRIAGES.

- EASTON—WHITE.—On March 22nd, at Wirksworth Parish Church, William Cochrane Calrnile Easton, Captain, R.A.M.C., son of the late George Easton, of Ayrshire, to Lillian Dorothy, third daughter of John H. and Mrs. White, of Alderwasley, Derbyshire.  
 HOOPER—ARMSTRONG.—On March 21st, at the Church of St. Mary the Virgin, Gillingham, Dorset, Reginald Arthur Hooper, Captain, R.A.M.C., to Daisy, daughter of R. B. Armstrong, The Hermitage, Gateshead-on-Tyne.  
 MAYBURY—JAMES.—On March 19th, at Christ Church, Woburn-sq., W.C., Captain A. V. Maybury, R.A.M.C. (T.F.), to Agnes Maud, second daughter of Mr. and Mrs. J. James, of West Haddon Lodge, Rugby.

### DEATHS.

- CLARK.—On March 13th, killed in action, William Brown Clark, M.B., B.S., Captain, R.A.M.C., aged 37.  
 LESLIE.—On March 20th, in London, after a long illness, Lucille Doxat Leslie, L.R.C.P., L.R.C.S. Edin., L.F.P.S. Glasg.  
 N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

## Notes, Short Comments, and Answers to Correspondents.

### BOOKS OF REFERENCE.

IN spite of the difficulties of publication at the present time owing to conditions produced by the war, works of reference continue to appear with commendable regularity, though the date of publication is occasionally delayed. Among those which have recently appeared are *The Year Book of the Scientific and Learned Societies of Great Britain and Ireland* (London: Charles Griffin and Co. Price 7s. 6d. net), *The Public Schools Year Book, 1917* (The Year Book Press, 31, Museum-street, W.C. Price 6s. net), and *Herbert Fry's Royal Guide to the London Charities, 1917* (London: Chatto and Windus. Price 1s. 6d.). The first named is a record of the work done in science, literature, and art during the session 1915-16 by numerous societies and Government institutions, the information being compiled from official sources. In addition to the lists of papers read at the different societies, details are given as to officers, dates of meetings, conditions of membership, and publications. The number of pages dealing with biology, including microscopy and anthropology, is 46, with psychology 6, and with medicine 35, while economic science and statistics occupy 12 pages. The synopsis of contents, the arrangement of the societies, and the index make the task of reference an easy task.—*The Public Schools Year Book*, which is edited by Mr. H. F. W. Deane, librarian to the Dean and Canons of St. George's, Windsor Castle, and Mr. A. Bulkeley Evans, Barrister-at-law and secretary to the Headmasters' Conference, is an admirable guide to both parents and guardians, while it is at the same time the official book of reference of the Headmasters' Conference. The public schools are arranged in alphabetical order, and full information is given with regard to governing bodies, staff, nomination and admission, entrance examination and scholarships, as well as conditions of admission to the Navy, Army, Civil Service, and other professions. The Navy and Army sections have been brought up to date and include the regulations for permanent and temporary commissions which have been introduced owing to the war. A concluding section of the book gives a list of preparatory schools and a list of tutors.—*Fry's London Charities*, which is edited by Mr. John Lane, gives in alphabetical order the charities of London with their name, date of foundation, address, objects, and annual income. In the preface reference is made to the steadily declining birth-rate, and to the fact that while the advance of science has caused a fall in the general death-rate, that for young babies has hardly gone down at all, one-fifth of the deaths occurring in the first week, one-third in the first month, and nearly half in the first three months. Mr. Lane hopes that "a day will dawn when, for the first time in the history of the world, civilisation will honestly face the fact that its true wealth is to be found not merely in the treasure-houses of the great, but in the humble cradles of the labour that fills those treasure-houses. Europe will need all, and more than all, the children that are born within the next few years."

### THE RIGHT AND LEFT HANDS.

To the Editor of THE LANCET.

SIR.—With respect to the note in THE LANCET last week, under this heading, regarding muscular tremor in those unaccustomed to manual labour, I have found that holding in the hand a pear-shaped incandescent electric-light bulb containing a single filament shows rather well any tremors of the muscles, the quivering filament vibrating more or less vigorously according to the tremor, or emotion even. A sheet of fairly stiff paper horizontally held by one corner will show by its vibration of the opposite corner the state of the muscles. A cup of water will show tremor by its surface vibrations, and there are many other methods, apart from the scientific instruments employed by experts. Sedentary workers changing their employment to manual labour should learn the science of the implement. For instance, with the spade there is a right size, weight, shape, handle height, and form of tread or foot-piece (some adjustable) for the foot to be considered, and the right thrust and amount of material to be lifted at a time, and the right method of turning and throwing. These instructions are usually obtainable from old and experienced hands and those who have studied the knacks. The knowledge of the knacks must save fatigue in labour and make the work more expeditious. Some years ago in America a methodical foreman had to have cleared two large heaps of material. One lot was shovelled in the usual fashion and the other heap was removed by men using certain chosen shovels, holding and handling the shovel in a certain manner and taking certain quantities. The result

was all in favour of the methodical work. The proper resting of the limbs, alternately and in rotation, and the study of the pushes and pauses, must make a considerable difference to the result both to the worker and the work.

Again, the question of liquid refreshment during and after the work is no doubt a factor. Alcoholic drinks during manual labour do not suit everybody and only produce clogging effects on the muscles after the first spurt of work so occasioned has subsided, and will sometimes tend to prolong and increase any after-tremor. In the summer of 1872 it was necessary to shift the rails of 500 miles of permanent way on the Great Western Railway from broad to narrow gauge in a fortnight, and 3000 men did it working double time, with a record of health, and drank only skilly—a successful experiment. A ration per man was allowed of 1½ lb. oatmeal and ½ lb. sugar, and the cooks prepared it in buckets, the drink being taken round to the men with pannikins.

I am, Sir, yours faithfully,  
R. I. H.

March 26th, 1917.

### THE SUMMER TIME ACT.

In this country and on the Continent summer-time dates for 1917 have been arranged as follows: England, April 8th to Sept. 17th; France, March 24th-25th to Oct. 7th; Italy, March 25th to Sept. 20th; Holland, April 16th to Sept. 17th; Hungary, April 16th to Sept. 17th; and Germany, April 16th to Sept. 17th.

It will be seen that France and Italy have already started summer time, and to avoid confusion this should be remembered. Summer time will start in England earlier than last year, when it commenced May 20th-21st, and ended Sept. 30th-Oct. 1st.

### UGANDA HEALTH REPORT.

ACCORDING to the Blue-book of the Uganda Protectorate for the year ended March 31st, 1916, just presented to Parliament, the population of the territory is now estimated at 2,887,800. This total includes 963 Europeans, of whom 272 are females, and 3455 Asiatics (2809 males and 646 females). The conditions of general health during 1915 were satisfactory. The number of cases treated in Government hospitals and dispensaries showed a decrease to 77,467, with 203 deaths, from 90,730, with 298 deaths, in the year 1914. The number of European officials resident during the year was 481. Three were invalidated, bringing the total invalidated in the last five years to 18, the principal causes being nervous and mental diseases, blackwater fever, circulatory affections, and general debility. 532 Europeans (including officials) were treated at Government hospitals at Entebbe and Jinja, the principal diseases being malarial and alimentary.

Amongst the native population plague prevails mainly in the Eastern Province, although cases have occurred in other areas. The disease has increased in the Lango district of the Eastern Provinces, but its incidence elsewhere, where organisation for prevention is in force, has diminished considerably. The work of native inspectors, appointed to control both plague and small-pox and prevent the concealment of cases, has been beneficial, and rewards for the destruction of rats have been offered with good results in the Lango district. Inoculation of the general population in the endemic area with Haffkine's prophylactic was carried out only in Lango. Elsewhere, apart from a few hundred injections performed in Mbale and Soroti stations, inoculation was confined to military porters recruited from the endemic districts. The number of deaths reported from the three most infected areas are subjoined for the past two years:—

	1914.	1915.
Bukedi ... ... ...	1963	1912
Teso ... ... ...	651	615
Lango ... ... ...	624	951
<b>Totals ... ...</b>	<b>3238</b>	<b>3478</b>

The number of cases and deaths under the head of sleeping sickness have dwindled almost to a negligible quantity. The clearings made to exclude the tsetse fly from ferries and ports along recognised waterways have been maintained, but independent research has had to be postponed in consequence of the requisition of all available medical officers for military duty. The local situation necessitated the suspension of the bionomic investigations which have been conducted by Mr. W. F. Fiske for the past 27 months under the auspices of the Royal Society. It is hoped that these studies will be resumed after the cessation of hostilities, when it is anticipated that important practical experiments may be undertaken and the lessons derived from the investigations thus be carried to a satisfactory conclusion. The deaths attributed to sleeping sickness in 1915 in combined native and official returns were 352, as compared with 466 during 1914. Only 3 of these deaths occurred in Buganda Province, where, it may be recalled, the fatal cases in 1905 numbered 8003. Serious epidemics of small-pox took place in 1915-16 in the

Buganda and Eastern Provinces. In the former the strict measures adopted have practically stamped out the disease. The Eastern Province outbreak proved more widespread, and though the virulent stage of the epidemic has been overcome the disease is still prevalent in the Bugishu hills and, to a less extent, in the remainder of the Bukedi and Busoga districts.

#### THE PLYMPTON (DEVON) BOARD OF GUARDIANS AND MEDICAL RECOMMENDATIONS.

AN inquest was recently held at Brixton (Devon) relative to the death of a married woman. It was stated that the medical officer ordered beef-tea for the deceased, but the guardians would not allow it. The husband earned 23s. weekly and had nine children to provide for. The coroner remarked that the guardians incurred a grave responsibility in refusing the doctor's orders, and had the medical man only said that death had been accelerated by want of the nourishment their position would have been serious. The jury returned a verdict in accordance with medical evidence and added a rider to the effect that the "guardians' conduct was scandalous," and expressed a hope "that in future more care would be taken."

#### SCHOOL-BOYS' CHEMICAL EXPERIMENTS.

BEFORE Mr. Justice Darling and a special jury recently a case was tried in the High Court in which a school-boy, A. C. Askew, suing through his father as his next friend, claimed damages against the Middlesex County Council, as the county education authority, for personal injuries due to the alleged negligence of the defendants. Young Askew with other boys formed a class under the charge of Miss Rollinson, a Bachelor of Science of London University and a lady with 17 years' experience as a teacher. The boys were directed to place a certain quantity of sawdust on crucible lids to warm it, and having been given small quantities of nitric acid in test-tubes, to drip the acid on to the sawdust, using glass tubes as drippers, which they had to fetch from a drawer. For the purpose of their experiments they were divided into groups of three, one of whom would perform the experiment. One of the other boys in the plaintiff's group was looking for a tube when another boy said that the sawdust was ready, so, instead of waiting, the boy who should have found the dripper poured some of the acid from his test-tube on to the sawdust, when a violent action took place, causing disfiguring injuries upon the plaintiff's face. The evidence called on his behalf, apart from the evidence of fact, was to the effect that Miss Rollinson should have performed the experiment herself, as it was a demonstrator's experiment, instead of which she was engaged upon other work in another part of the room, and that charcoal should have been used instead of sawdust. It was also suggested on behalf of the plaintiff that the boy who handled the tube containing the nitric acid was known to be mischievous. Evidence was given on behalf of the defendants to the effect that the experiment was a proper and safe one in the circumstances, and that from an instructor's point of view it was much better to let boys conduct suitable experiments themselves than to demonstrate before them. It was submitted on behalf of the defendants that there was no evidence of negligence to go to the jury, but Mr. Justice Darling declined to withdraw the case from the jury on that ground, and eventually a verdict was found for the boy for £250 damages, and his father, who claimed compensation for the expense of medical attendance on his son, was awarded £25. Mr. Justice Darling gave judgment for these amounts, but granted a stay of execution with a view to an appeal.

**A. B. J.**—Any man who has signed a year's contract has the right to come out of the Service at the termination of the contract. But if he was under 41 at the time when the Military Service Act was passed he becomes liable under that Act, and therefore, of course, can be taken as a combatant. If immediately upon coming out he enrolls with the Central Medical War Committee (under Army Order 485 of 1916) he can be taken for the Royal Army Medical Corps after consultation with the Committee. The agreement with the Committee is in such cases to give the man a month's notice of the date on which he will be called up. Up to the present the Central Medical War Committee has not called upon any man to re-enter the Service unless he has been at home at least a year.

The following journals, magazines, &c. have been received:—*Jurnal d'Urologie*, Dublin; *Journal of Medical Science*, *Revue d'Hygiène et de Police Sanitaire*, *Archives Médicale et Pharmacie Navale*, *Birmingham Medical Review*, *Canadian Practitioner and Review*, *Dominion Medical Monthly*, *American Journal of Medical Sciences*, *Mercy and Truth*, *Medical and Legal Journal*, *American Journal of Obstetrics*, *American Journal of Surgery*, *Surgery*, *Gynecology and Obstetrics*, *Medical Journal of South Africa*, *Ophthalmology*, *Annals di Medicina Navale e Coloniale*, *Interstate Medical Journal*.

## Medical Diary for the ensuing Week.

### SOCIETIES.

MEDICAL SOCIETY OF LONDON, 11, Chandos-st., Cavendish-sq., W.

MONDAY.—8.30 P.M., Discussion on the Treatment of Arterio-Venous Aneurysm, opened by Col. G. J. Symonds, R.A.M.C., O.B., and Major R. H. Jocelyn Swan, R.A.M.C.

RÖNTGEN SOCIETY, at the Cancer Hospital (Free), Fulham-road, S.W.

TUESDAY.—8.15 P.M., General Meeting.

### LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Partoe: Operations.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simson: Gynaecological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Partoe: Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY.—Clinics.—10.30 A.M., Surgical Out-patients (Mr. H. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham); Gynaecological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

TUESDAY.—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting).

WEDNESDAY.—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M., Eye Operations (Mr. R. P. Brooks).

THURSDAY.—2.30 P.M., Gynaecological Operations (Dr. A. H. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

FRIDAY.—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. H. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

ROYAL INSTITUTION OF GREAT BRITAIN, Albemarle-street, Piccadilly, W.

MONDAY.—5 P.M., General Monthly Meeting.

### METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, March 28th, 1917.

Date.	Main-fall.	Solar Radio in Vacuo.	Maxi- mum Temp. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Remarks.
Mar. 22	...	73	41	31	32	33	Cloudy
" 23	0.03	66	40	30	32	33	Snowing
" 24	0.04	73	45	28	30	31	Fine
" 25	...	65	49	31	36	37	Overcast
" 26	0.04	77	44	37	39	40	Raining
" 27	0.03	74	42	31	32	34	Cloudy
" 28	0.05	62	45	33	34	36	Overcast

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

### EDITORIAL NOTICES.

It is most important that communications relating to the Editorial business of THE LANCET should be addressed exclusively "To the EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.

We cannot undertake to return MSS. not used.

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## MANAGER'S NOTICES.

## ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the new year, the price was raised to 8d. The rates of subscription remain as revised in October.

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WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C. 2, are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and not to THE LANCET Offices.

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